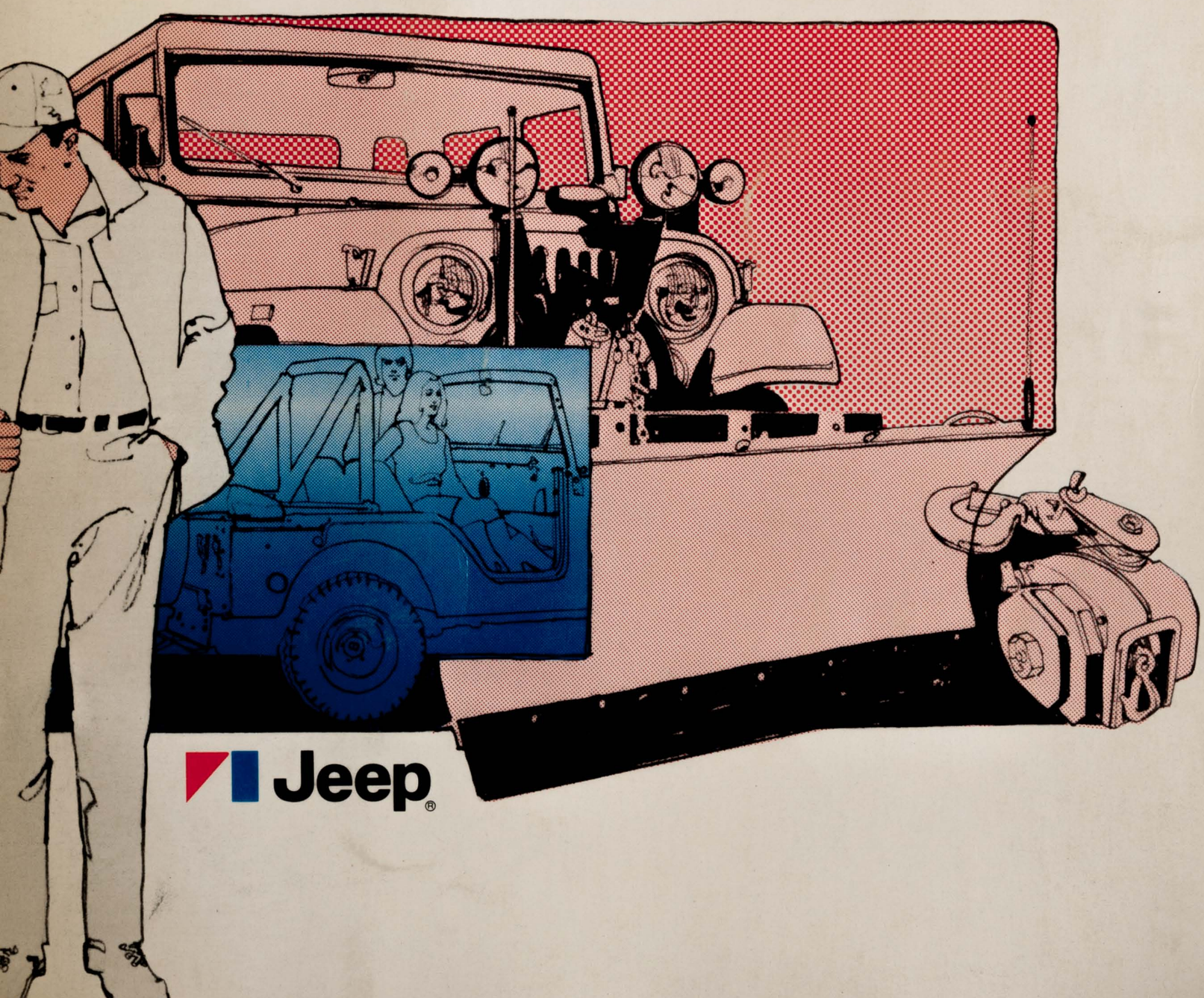
JEEP SPECIAL EQUIPMENT TECHNICAL SERVICE MANUAL

CJ-5, CJ-6, CHEROKEE, WAGONEER, TRUCK.



Jeep®

FOREWORD

This manual contains installation, diagnosis, disassembly, repair and assembly procedures for Jeep CJ, Cherokee, Wagoneer and Truck Special Equipment.

The section index on the opposite page allows you to quickly locate any desired section. The first page of each section has a black tab in a position corresponding to the tab on the index page. To locate a section, simply fold back the manual slightly to expose the outside edges of the pages. Find the tab that aligns with the index tab and open to that page. At the beginning of each section is an index which gives the page number on which major subjects begin. An alphabetical index is also included in the back of the manual.

Brand names mentioned in this manual are for convenience and identification only and are not intended as a recommendation to use a specific brand of product. They are indicative of a class or type and may be substituted by their equivalent.

All information and specifications in this manual are based on the latest data available at the time of publication. Jeep Corporation reserves the right to discontinue models and change specifications or design without notice or incurring obligation.

Special Equipment

Technical Service Manual

CJ-5/CJ-6 Cherokee Wagoneer Truck

Service Department

Jeep Corporation

Section Index

Special Equipment

Technical Service Manual

CJ-5\CJ-6 Cherokee Wagoneer Truck

Jeep Division
AM General Corporation

GENERAL INFORMATION

GENERAL

This publication contains essential installation, removal, adjustment, and maintenance procedures for Jeep CJ-5/6, Cherokee, Wagoneer, and Truck Special Equipment.

Ten major items comprise the Jeep Special Equipment lineup. They are: snow plow, cabs, bumpers, minispreaders, winches, tire carriers, hubs, trailer hitches and helper spring kits, roll bars, and wreckers. Service procedures for each main item are covered in separate sections of this manual.

SPECIAL TOOLS

Special tools may be required for some service operations. When such tools are required, reference will be made to the tool name and number in the service procedure and on the special tool illustration at the end of the section.

WARNING: *Using procedures other than those recommended in this manual could be detrimental to the safe operation of the vehicle serviced, as well as the safety of the person or persons servicing the vehicle.*

STANDARD TORQUE SPECIFICATIONS AND CAPSCREW MARKINGS

All critical torque specifications are listed in the appropriate procedural steps. Where no torque reference is given, refer to the accompanying Standard Torque Specifications and Capscrew Markings Chart. Note that torques given in the chart are based on use of clean and dry threads. Reduce torque by ten percent when threads are lubricated with engine oil, and by twenty percent if new plated capscrews are used.

CAUTION: *Capscrews threaded into aluminum may require reductions in torque of 30 percent or more unless inserts are used.*

STANDARD TORQUE SPECIFICATIONS AND CAPSCREW MARKINGS

SAE Grade Number	1 or 2		5		6 or 7		8	
Capscrew Head Markings Manufacturer's marks may vary. Three-line markings on heads shown below, for example, indicate SAE Grade 5.								
Usage	Used Frequently		Used Frequently		Used at Times		Used at Times	
Capscrew Diameter and Minimum Tensile Strength psi	To 1/2 - 69,000 To 3/4 - 64,000 To 1 - 55,000		To 3/4 - 120,000 To 1 - 115,000		To 5/8 - 140,000 To 3/4 - 133,000		150,000	
Quality of Material	Indeterminate		Minimum Commercial		Medium Commercial		Best Commercial	
Capscrew Body Size (Inches) - (Thread)	Torque		Torque		Torque		Torque	
	Ft-Lb	Nm	Ft-Lb	Nm	Ft-Lb	Nm	Ft-Lb	Nm
1/4-20	5	6.7791	8	10.8465	10	13.5582	12	16.2698
-28	6	8.1349	10	13.5582			14	18.9815
5/16-18	11	14.9140	17	23.0489	19	25.7605	24	32.5396
-24	13	17.6256	19	25.7605			27	36.6071
3/8-16	18	24.4047	31	42.0304	34	46.0978	44	59.6560
-24	20	27.1164	35	47.4536			49	66.4351
7/16-14	28	37.9629	49	66.4351	55	74.5700	70	94.9073
-20	30	40.6745	55	74.5700			78	105.7538
1/2-13	39	52.8769	75	101.6863	85	115.2445	105	142.3609
-20	41	55.5885	85	115.2445			120	162.6960
9/16-12	51	69.1467	110	149.1380	120	162.6960	155	210.1490
-18	55	74.5700	120	162.6960			170	230.4860
5/8-11	83	112.5329	150	203.3700	167	226.4186	210	284.7180
-18	95	128.8027	170	230.4860			240	325.3920
3/4-10	105	142.3609	270	366.0660	280	379.6240	375	508.4250
-16	115	155.9170	295	399.9610			420	569.4360
7/8- 9	160	216.9280	395	535.5410	440	596.5520	605	820.2590
-14	175	237.2650	435	589.7730			675	915.1650
1- 8	235	318.6130	590	799.9220	660	894.8280	910	1233.7780
-14	250	338.9500	660	894.8280			990	1342.2420

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SERVICE MANUAL IMPROVEMENTS

You are encouraged to report errors, omissions, or recommendations for improving this publication. A form provided for this purpose is included at the end of this section.

Decimal Equivalents (Chart)

FRACTIONS		DECIMALS		FRACTIONS		DECIMALS	
64ths	32nds	Two Place	Three Place	64ths	32nds	Two Place	Three Place
1		.02	.016	33		.52	.516
	1	.03	.031		17	.53	.531
3		.05	.047	35		.55	.547
1/16		.06	.062	9/16		.56	.562
5		.08	.078	37		.58	.578
	3	.09	.094		19	.59	.594
7		.11	.109	39		.61	.609
1/8		.12	.125	5/8		.62	.625
9		.14	.141	41		.64	.641
	5	.16	.156		21	.66	.656
11		.17	.172	43		.67	.672
3/16		.19	.188	11/16		.69	.688
13		.20	.203	45		.70	.703
	7	.22	.219		23	.72	.719
15		.23	.234	47		.73	.734
1/4		.25	.250	3/4		.75	.750
17		.27	.266	49		.77	.766
	9	.28	.281		25	.78	.781
19		.30	.297	51		.80	.797
5/16		.31	.312	13/16		.81	.812
21		.33	.328	53		.83	.828
	11	.34	.344		27	.84	.844
23		.36	.359	55		.86	.859
3/8		.38	.375	7/8		.88	.875
25		.39	.391	57		.89	.891
	13	.41	.406		29	.91	.906
27		.42	.422	59		.92	.922
7/16		.44	.438	15/16		.94	.938
29		.45	.453	61		.95	.953
	15	.47	.469		31	.97	.969
31		.48	.484	63		.98	.984
1/2		.50	.500	1		1.00	1.000

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READER'S COMMENTS

Jeep Corporation maintains a continuous effort to improve the quality and usefulness of its publications. To do this effectively we need user feedback — your critical evaluation of this manual.

Please comment on this manual's completeness, accuracy, organization, usability and readability.

Did you find errors in this manual?

How can this manual be improved?

Please describe your position.

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ATTENTION: CORPORATE PUBLICATIONS

SNOW PLOW—SNOW PLOW POWER PACKS

SNOW PLOWS

GENERAL

The various installations and combinations of kits are covered separately in these procedures for clarity. Before beginning installation, identify the parts in the kit against the parts list.

ALTERED VEHICLE REGULATIONS

Federal regulations require that anyone altering a vehicle in such a manner that its stated weight ratings are no longer valid must not allow the original certification to remain on the vehicle. An additional label of the type enclosed with the kit must be affixed to the altered vehicle.

Installing snow plows on the vehicles listed below affects compliance with the Federal Motor Vehicle Safety Standards and the installer is required to certify and place an alterer's label on the vehicle (fig. 1-1).

Fill in the required information and locate as follows:

- **CJ Models:** Affix decal (AMC Part Number SF 5354425) near existing weight rating tag on instrument panel.
- **Cherokee-Wagoneer-Truck:** Affix decal (AMC Part No. SF 5354424) on hinge pillar of left door.

Be sure to cover the decal with clear protective film provided.

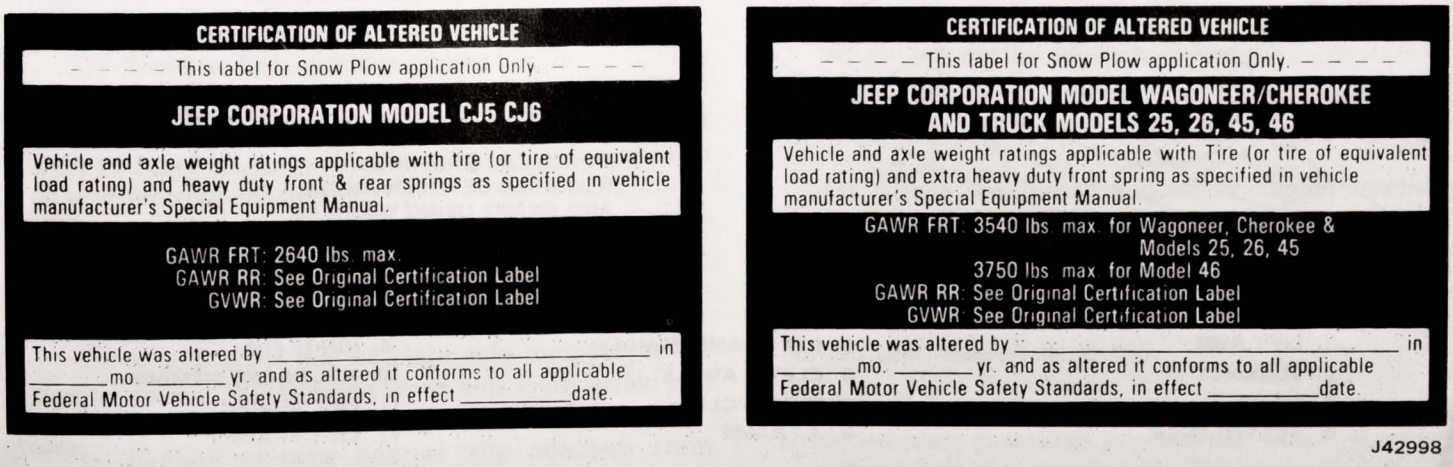


Fig. 1-1 Altered Vehicle Certification Labels

INSTALLATION—CJ MODELS

NOTE: *Do not tighten nuts and bolts until installation is complete (unless otherwise specified).*

(1) Remove screws and lockwashers securing steering gearbox to bracket and move steering gearbox out of way (see appropriate Jeep Technical Service Manual for detailed instructions).

(2) Remove nuts and bolts securing front bumper to frame and remove bumper. Retain attaching parts.

(3) Position and attach lift frame to frame rails, at forward holes only (fig. 1-2).

(4) Attach LH and RH frame members to rear of lift frame and to frame rails.

NOTE: *Install pipe spacer on inside of left side frame rail.*

(5) Using rear hole of frame members as a pilot hole, drill a 17/32-inch diameter hole through the inside frame rail. Install bolts.

NOTE: *Flat washers must be on outside of frame rails.*

(6) Attach clevis angle to frame side members.

(7) Install steering gearbox to bracket.

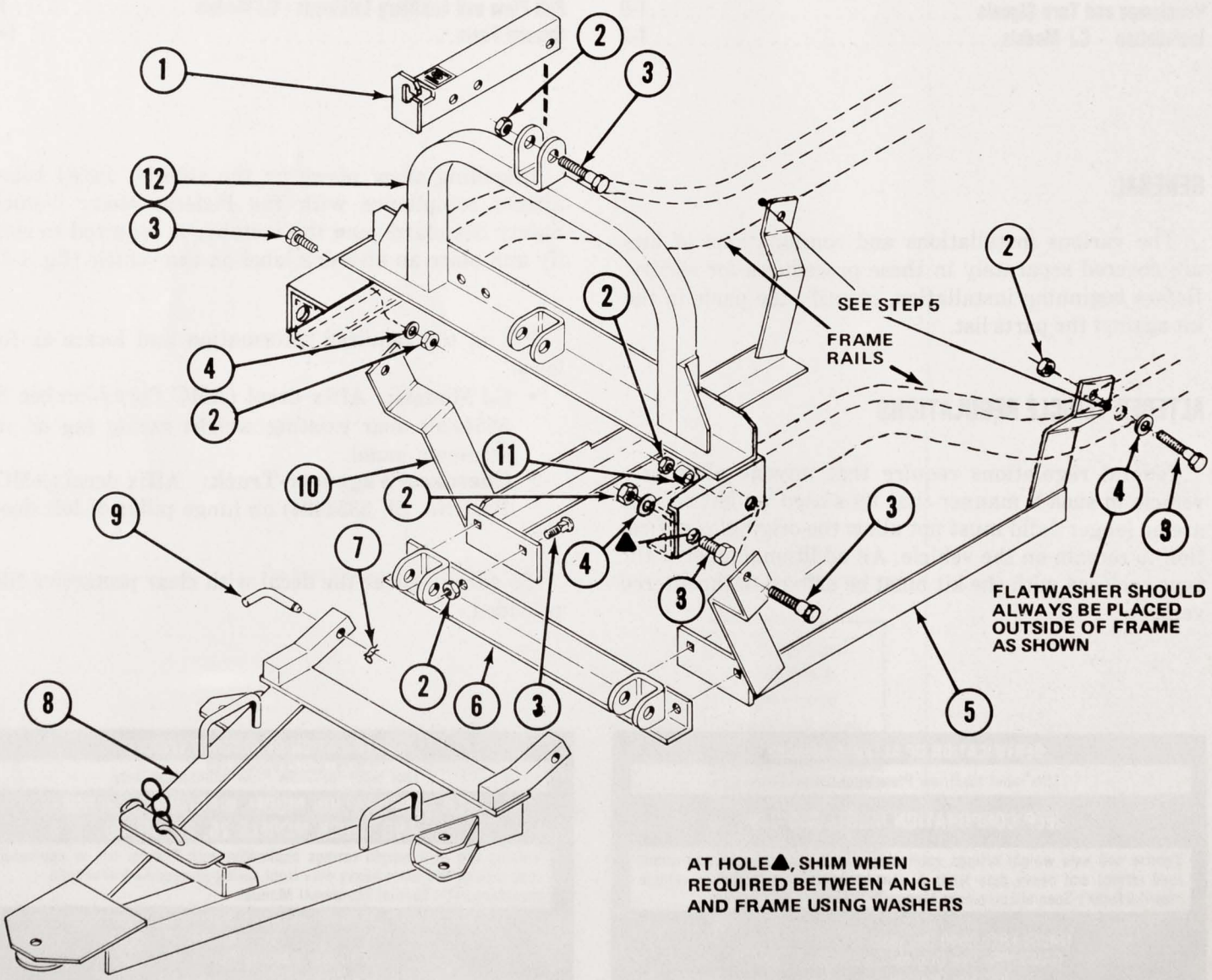


Fig. 1-2 Installation - CJ Models

(8) Install lift arm to lift frame.

(9) Install bumper (fig. 1-3).

(10) Connect A-frame to clevis angle with hinge pins and spring clips.

(11) Attach chain from A-frame to lift arm.

(12) When installation is complete tighten all bolts to 60 to 70 foot-pounds torque.

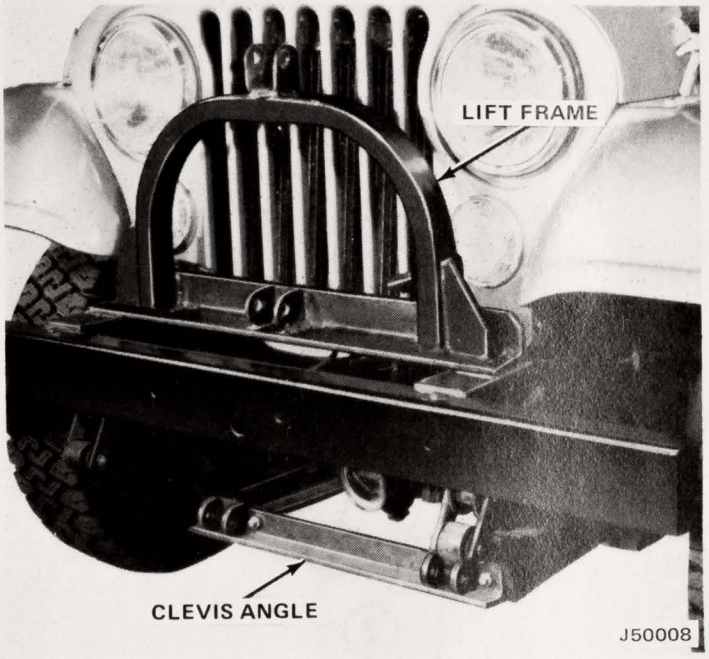


Fig. 1-3 Lift Frame and Mounting Frame Installed

INSTALLATION—CHEROKEE-WAGONEER-TRUCK

(1) Remove front bumper center section and right and left front bumper end sections (fig. 1-4). Retain attaching parts.

(2) Remove left and right bumper support arm assemblies (fig. 1-4 and 1-5).

(3) Grind face of front frame crossmember at point A (especially around bolt holes) to remove weld splatter and burrs to ensure tight fit.

(4) Position and attach lift frame to frame rails. (Use upper bolt holes only—lower holes will be used later to fasten bumper arms.)

(5) Remove flat washers under bolts attaching steering gear to frame (see appropriate Jeep Technical Service Manual). Remove and replace bolts one at a time in order to maintain alignment. Tighten nuts to 60 to 80 foot-pounds torque.

(6) Attach left plate side member to frame rail by inserting bolt from inside of frame rail using reinforcing block as washer and long spacer inside frame rail. Secure with locknut at end hole of plate.

(7) Attach front end of plate side member by inserting special bolt through front hole from inside and secure with locknut.

(8) Remove existing bumper clip adapters from already removed left and right bumper support arm assemblies.

(9) Attach left bumper support arm assembly and bolt plate side member.

(10) Install bolt and nut through lower hole in lift frame and LH plate side member.

(11) Attach bumper support arm assembly to side member and frame with bolt into weldnut in frame side member.

(12) Install bolt in back hole of bumper support assembly and through short spacer into weldnut in frame side member.

(13) Install right-hand plate side member and bumper support assembly.

(14) Attach clevis angle to plate side members. Tighten nuts to 60 to 70 foot-pounds torque.

(15) Attach lift arm to lift frame. Tighten nut to 30 foot-pounds torque.

(16) Attach center section of bumper to lift frame (use original bolts, lockwashers, and nuts). Tighten nuts to 30 foot-pounds torque.

(17) Attach new clip adapters to bumper support arms (Point B, fig. 1-4). Use original bolts, lockwashers, and nuts. Tighten nuts to 30 foot-pounds torque.

(18) Attach left bumper end section to bumper clip adapters and to lift frame. Use original carriage bolts, spacer bushing, lockwashers, and nuts.

(19) Attach right bumper end section to bumper clip adapters and lift frame. Tighten nuts to 30 foot-pounds torque.

(20) Connect A-frame to clevis angle with hinge pins and spring clips.

(21) Attach A-frame chain to lift arm.

MOLDBOARD AND SECTOR BUNDLE INSTALLATION - ALL MODELS

(1) Attach sector bundle to moldboard assembly with pivot pins and cotter pins (fig. 1-6).

NOTE: *Cotter pins should pass through tubing only. Do not engage pivot pins with cotter pins.*

(2) Attach eyebolts and trip springs to moldboard and sector bundle assembly.

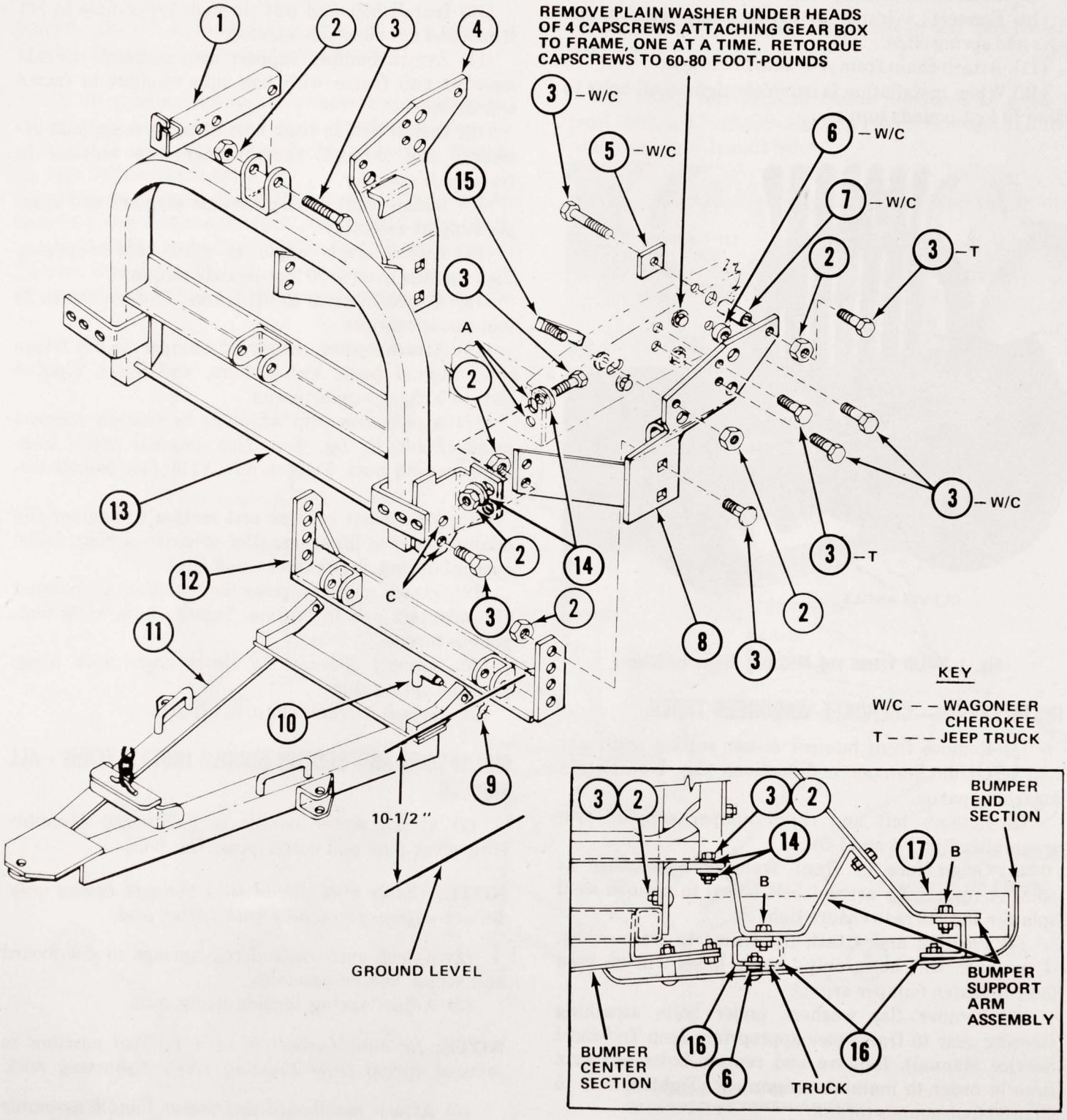
(3) Adjust spring tension using nuts.

NOTE: *Be sure eyebolt is in a vertical position to prevent spring from twisting when tightening nuts.*

(4) Attach moldboard and sector bundle assembly to A-frame with sector angle between nose plates of A-frame.

(5) Install kingbolt through sector bundle and A-frame and secure with locknut. Be sure to install kingbolt so that locknut is on top.

NOTE: *For installations without hydraulic angling rams, set plow in desired position and insert shear pin in nearest hole in sector bundle. The shear pin will lock plow in position.*



1. LIFT ARM
2. LOCKNUT
3. BOLT
4. R.H. PLATE SIDE MEMBER
5. REINFORCING BLOCK
6. SPACER–SHORT
7. SPACER–LONG
8. L.H. PLATE SIDE MEMBER
9. SPRING CLIP
10. HINGE PIN
11. A-FRAME
12. CLEVIS ANGLE
13. LIFT FRAME
14. FLAT WASHER
15. SPECIAL BOLT
16. BUMPER CLIP ADAPTER
17. GRAVEL GUARD

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Fig. 1-4 Snow Plow Installation - Cherokee-Wagoneer-Truck

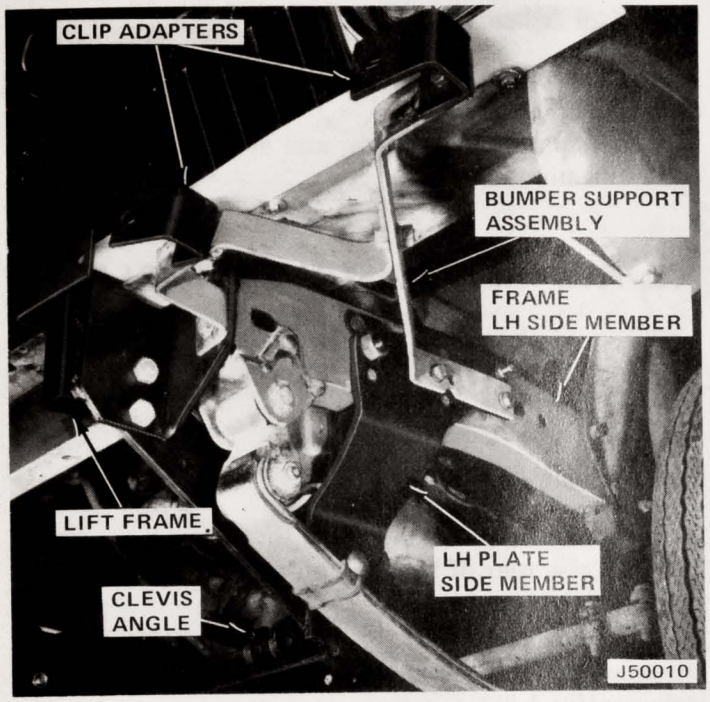


Fig. 1-5 Bumper Support Arm Installation

CAUTION: *Remove shear pin if unit is installed with hydraulic angling rams.*

Marker Installation—All Models

Install plow marker at each end of plow top angle with bolt, clamp, and locknut.

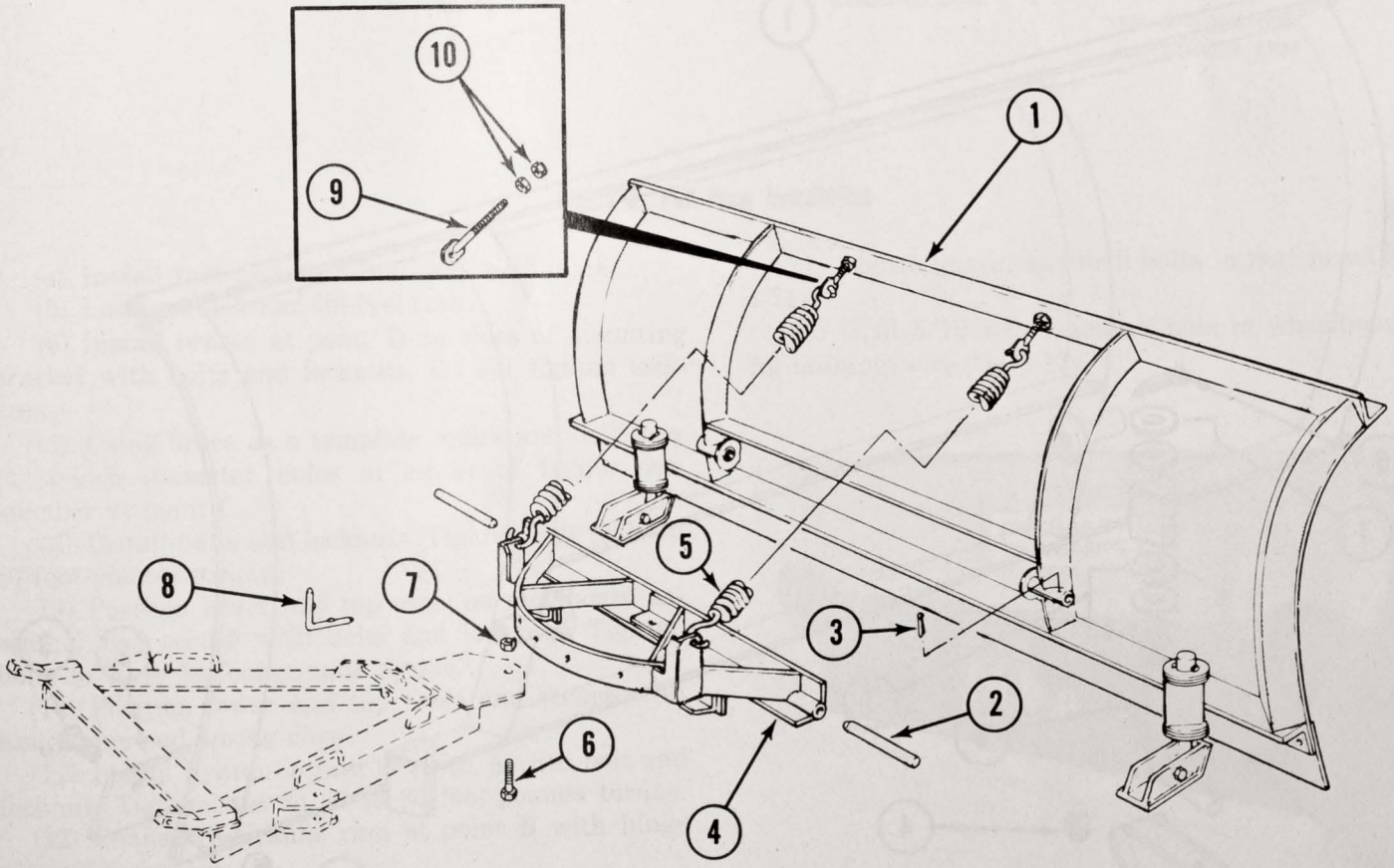
NOTE: *If plow does not have the necessary holes, drill a 5/16-inch diameter hole in the top angle at each end of the plow (fig. 1-7).*

Moldboard Assembly—All Models

Runner and Spindle

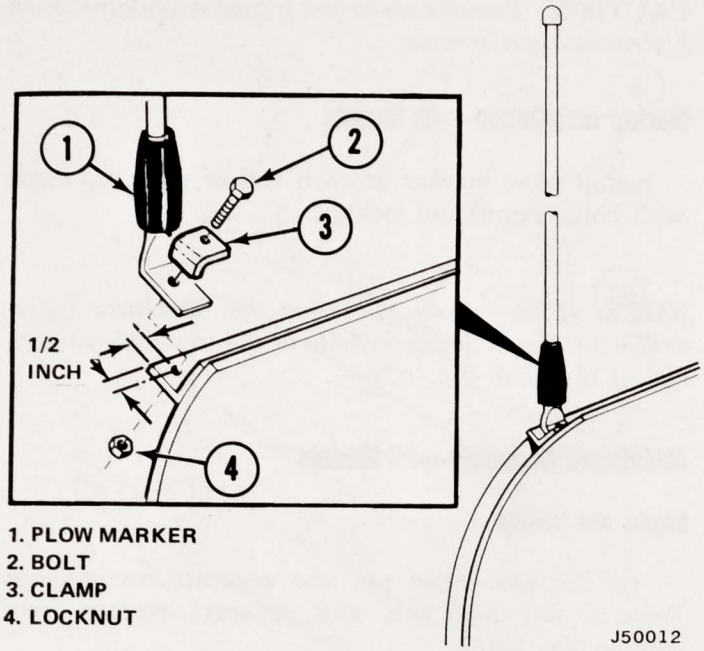
(1) Remove cotter pin and separate components. Remove nut and bolt and separate runner from spindle (fig. 1-8).

(2) Replace damaged components and assemble runner and spindle.



1. MOLDBOARD ASSEMBLY
2. PIVOT PIN
3. COTTER PIN
4. SECTOR BUNDLE
5. SPRING
6. KINGBOLT
7. LOCKNUT
8. SHEAR PIN
9. EYE BOLT
10. NUT

Fig. 1-6 Moldboard and Sector Bundle - Components and Installation



1. PLOW MARKER
2. BOLT
3. CLAMP
4. LOCKNUT

Fig. 1-7 Marker Installation

Cutting Edge Replacement

(1) Remove nuts and carriage bolts and remove cutting edge (fig. 1-8).

(2) Replace cutting edge and secure with carriage bolts and nuts.

PULL PLOW AND AUXILIARY TAILLAMPS—CJ MODELS

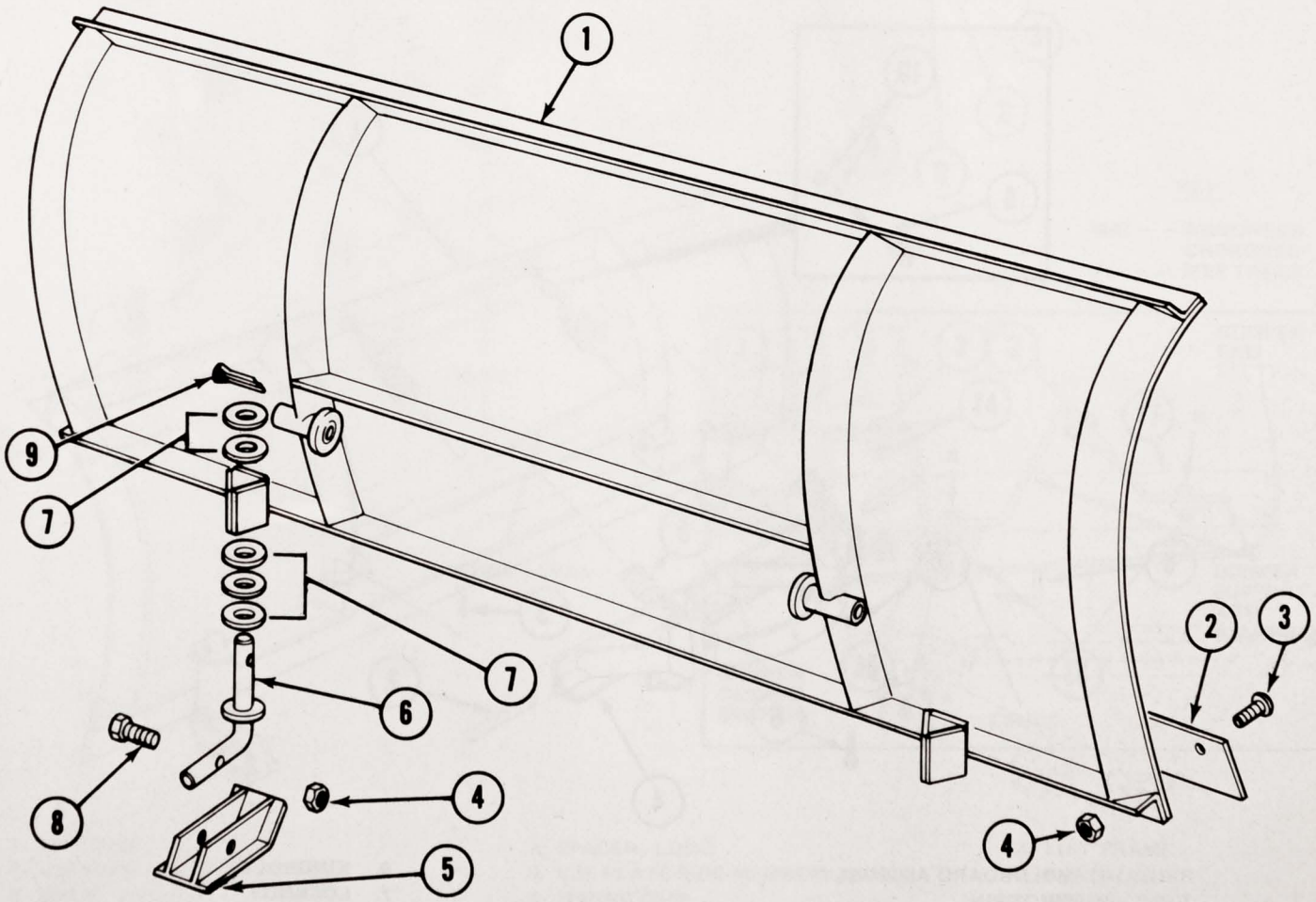
This installation is applicable to CJ Models with E-48 snow plow system.

Moldboard Installation

(1) Drain fuel tank.

(2) Raise rear of vehicle and remove fuel tank skid plate and fuel tank.

(3) Position bracket to align with holes in rear crossmember. Using spacers, install with bolts and locknuts (fig. 1-9).



1. MOLDBOARD
2. CUTTING EDGE
3. CARRIAGE BOLT
4. LOCKNUT
5. RUNNER
6. SPINDLE
7. WASHER
8. BOLT
9. COTTER PIN

Fig. 1-8 Moldboard Assembly

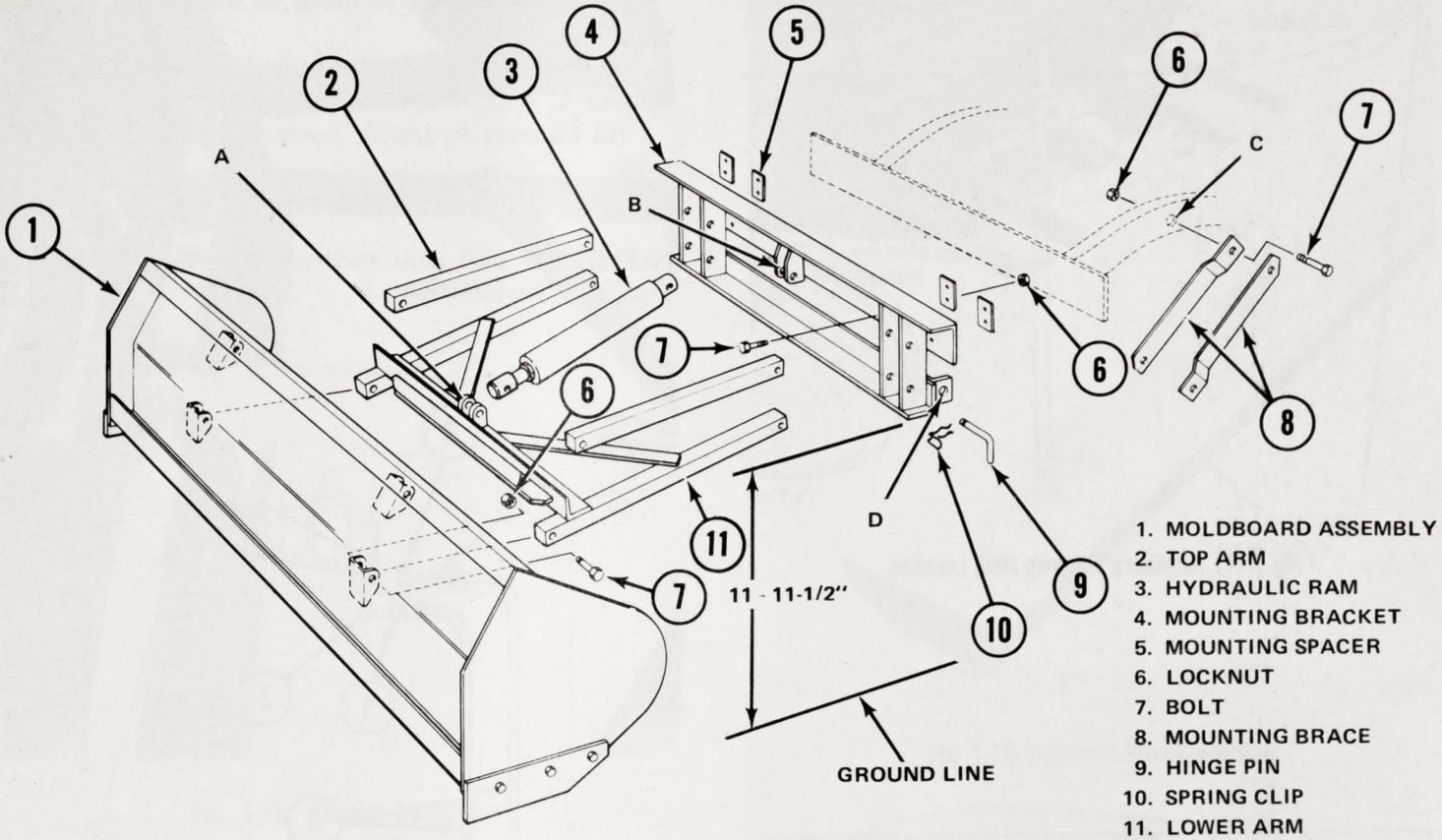


Fig. 1-9 Pull Plow Installation

(4) Install fuel tank and fuel tank skid plate.

(5) Lower vehicle and fill fuel tank.

(6) Install braces at point D on sides of mounting bracket with bolts and locknuts. Do not tighten locknuts.

(7) Using brace as a template, mark and drill two 11/16-inch diameter holes in center of frame side member at point C.

(8) Install bolts and locknuts. Tighten bolt to 70 to 80 foot-pounds torque.

(9) Position lower and top arms on moldboard assembly and secure with bolts and locknuts. Tighten bolts to 70 to 80 foot-pounds torque.

(10) Position lower and top arms and secure with hinge pins and spring clips.

(11) Install hydraulic ram at point A with bolt and locknut. Tighten nut to 70 to 80 foot-pounds torque.

(12) Connect hydraulic ram at point B with hinge pin and spring clip.

Auxiliary Taillamps

NOTE: *For pull plow installation, it is necessary to install a set of auxiliary taillights that will not be obscured when pull plow is in the raised position (fig. 1-10).*

(1) Locate, mark, and drill holes in rear panel (fig. 1-11).

(2) Drill 5/16-inch diameter hole in wheelhousing for taillamp wire (fig. 1-12).

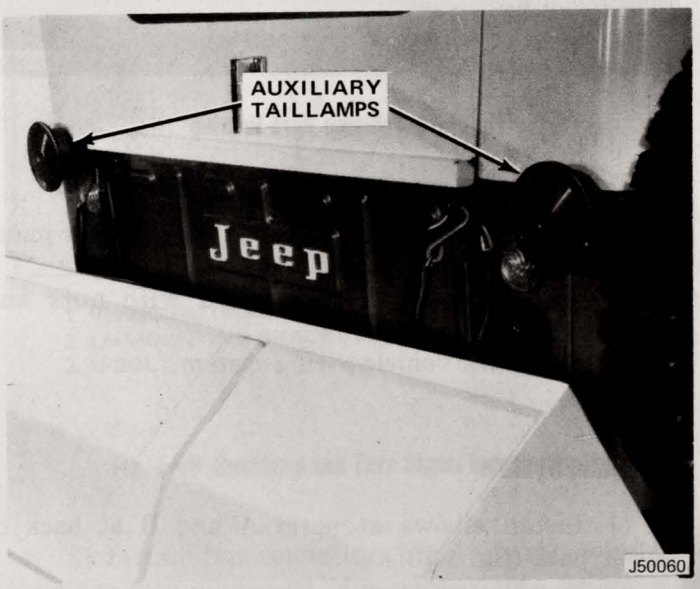


Fig. 1-10 Auxiliary Taillamps Installed

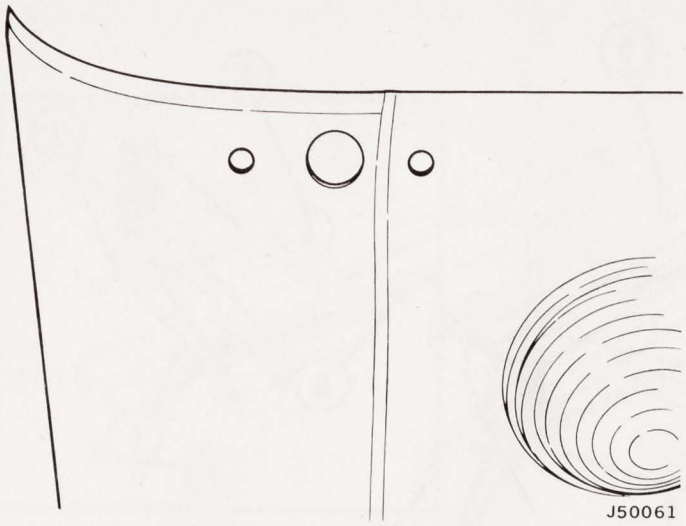


Fig. 1-11 Auxilliary Taillamp Hole Location

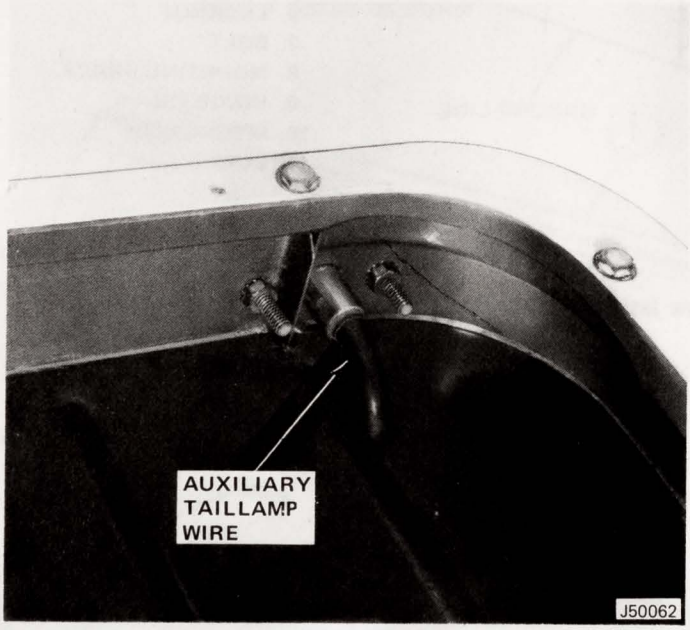


Fig. 1-12 Taillamp Wire Routing

(3) Route taillamp wire through hole in rear panel and wheelhousing.

(4) Secure taillamps in position with nuts and lockwashers.

(5) Splice into vehicle wiring system.

Hydraulic System

(1) Install elbows at ports A and B at back of power pack (fig. 1-13).

(2) Install connectors to elbows.

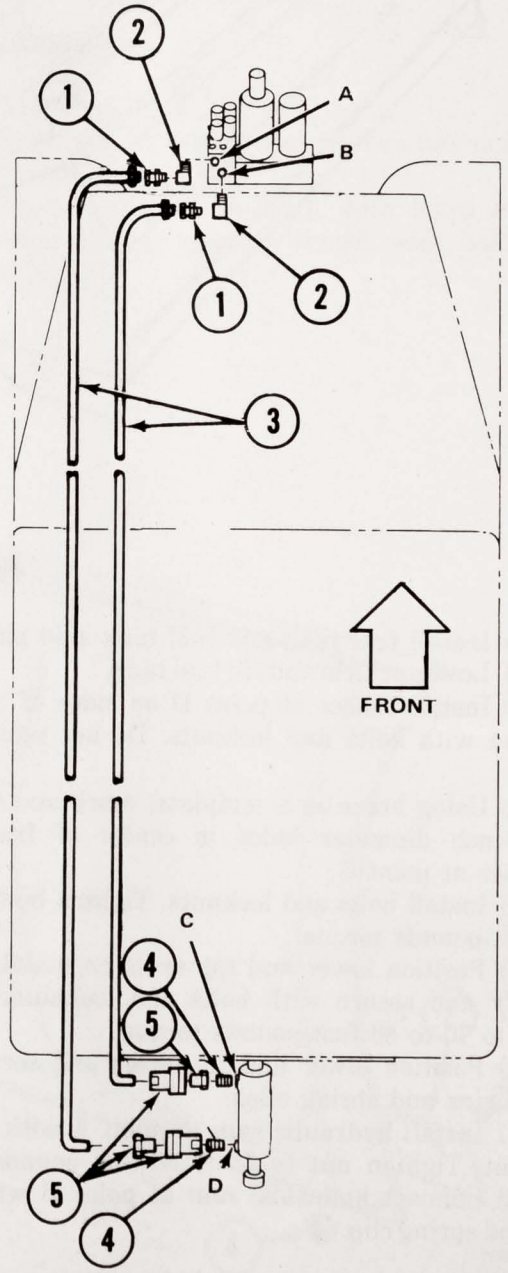
(3) Route hoses along left side of vehicle at frame side member.

(4) Connect front of hoses to connectors at power pack.

(5) Install close nipples in hydraulic ram and male coupler at rear of hydraulic ram (fig. 1-14).

(6) Connect hydraulic hoses to hydraulic ram (fig. 1-15).

NOTE: *For pull plow controls, see Electronic Power Pack E-48 Installation.*



1. CONNECTOR
2. PIPE ELBOW
3. HYDRAULIC HOSE
4. CLOSE NIPPLE
5. HYDRAULIC COUPLER

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Fig. 1-13 Hydraulic System Installation

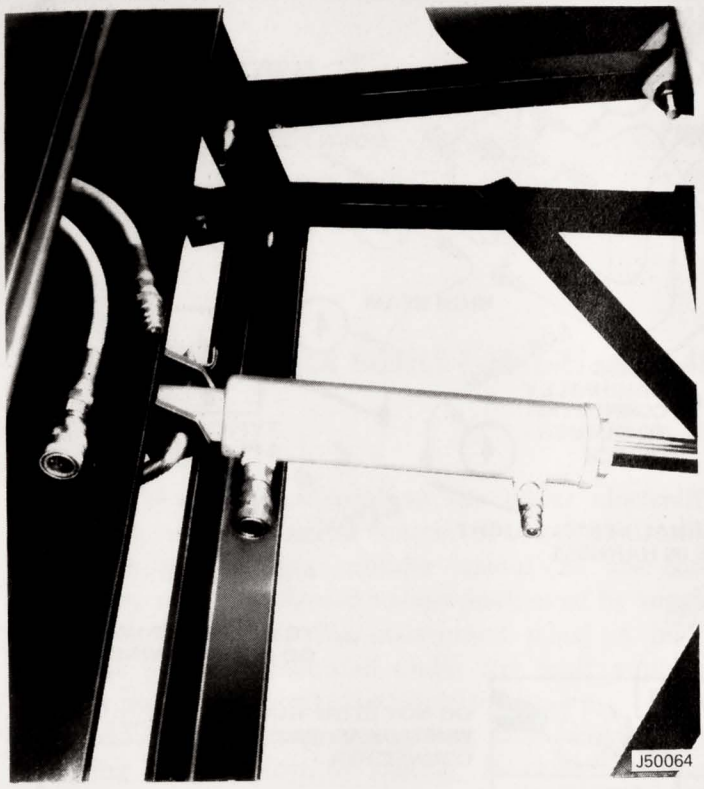


Fig. 1-14 Coupler Installation

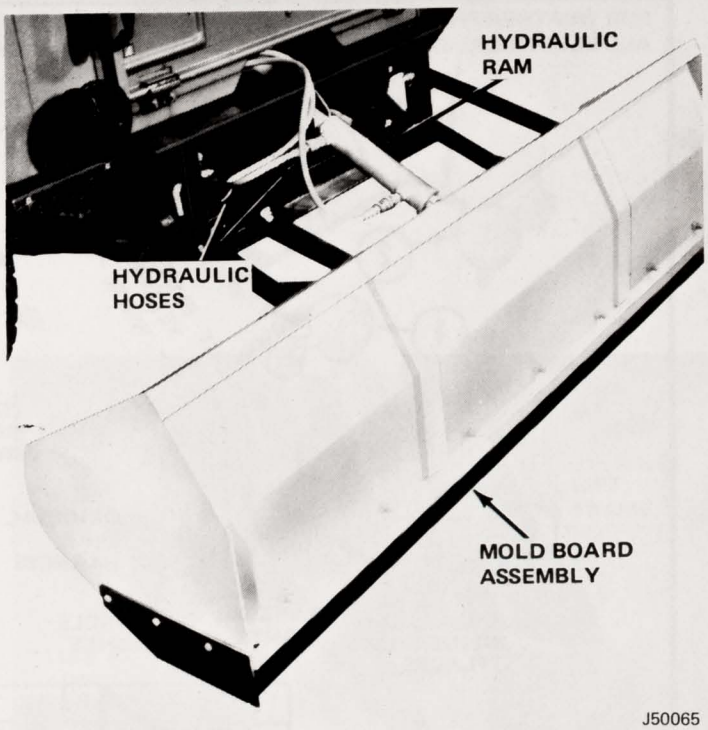


Fig. 1-15 Hydraulic Hose Installation

HEADLAMPS AND TURN SIGNALS

General

The headlamps and turn signals must be installed parallel to the ground. Adjust lamps to illuminate the roadway for same distance ahead as the original vehicle headlights.

NOTE: *Installer must certify that the installation conforms to the Federal Motor Vehicle Safety Standard 108.*

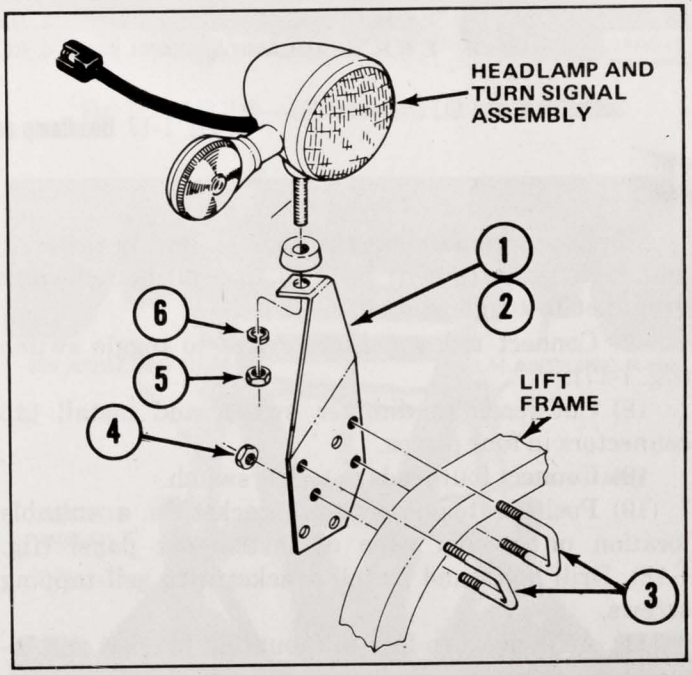
Installation

(1) Disconnect negative battery cable.

(2) Install headlamp brackets to lift frame with U-bolts and locknuts (fig. 1-16).

(3) Attach headlamp and turn signal assembly to mounting brackets with lockwashers and nuts.

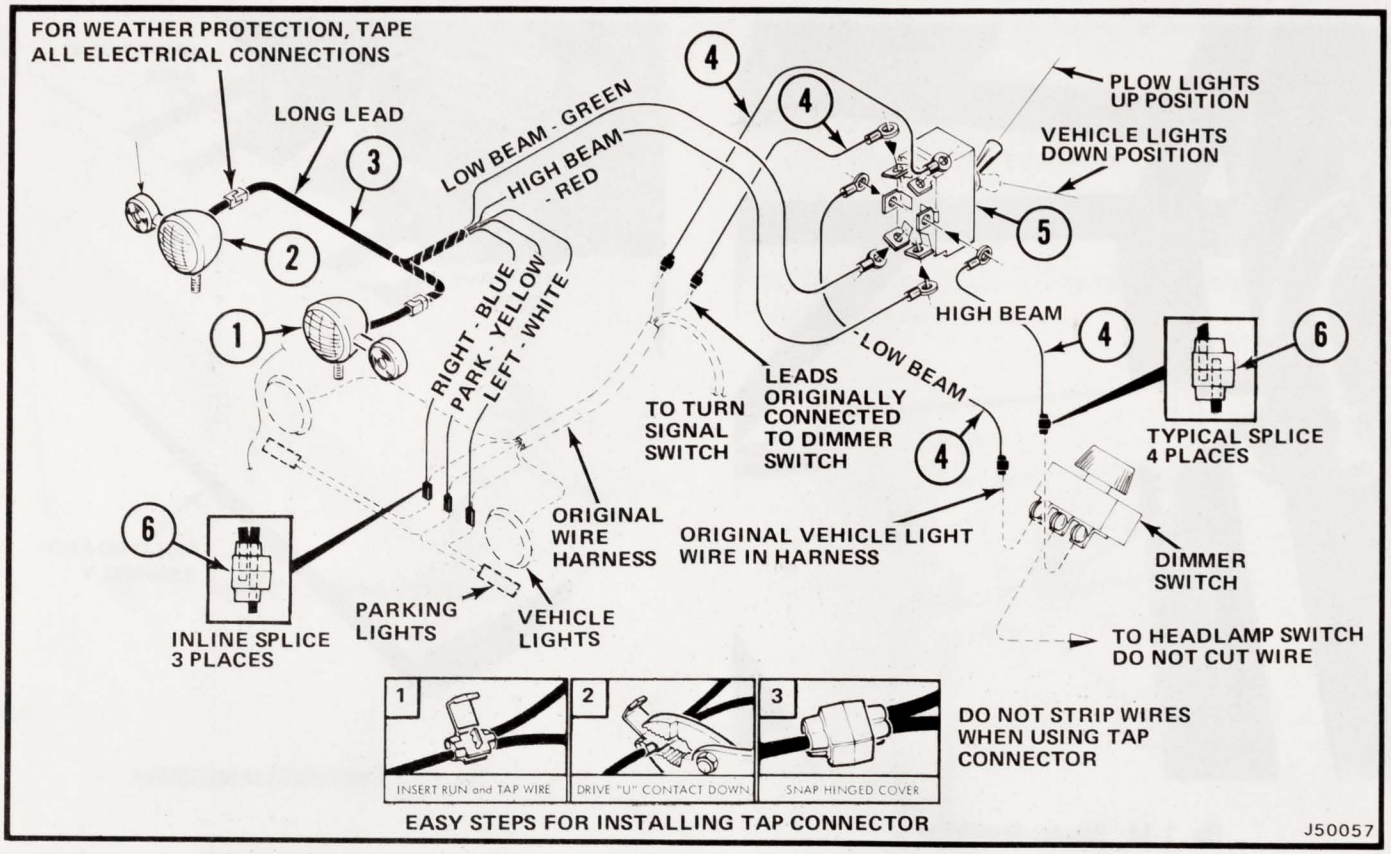
(4) Install wiring harness (fig. 1-17). Route plug ends through opening at upper left-hand corner of radiator and connect wires to headlight and turn signal assemblies.



1. RH MOUNTING BRACKET
2. LH MOUNTING BRACKET
3. U-BOLT
4. LOCKNUT
5. NUT
6. LOCKWASHER

Fig. 1-16 Headlamp and Turn Signal Installation

(5) Install tap connectors into original wire harness for turn signals at blue wire (right), yellow wire (park), and white wire (left).



1. L.H. HEADLAMP ASSEMBLY
2. R.H. HEADLAMP ASSEMBLY
3. HARNESS ASSEMBLY
4. BLACK WIRE
5. TOGGLE SWITCH
6. TAP CONNECTOR

Fig. 1-17 Headlamp and Turn Signal Wiring Installation

(6) Route remaining two wires, low beam (red) and high beam (green) back to firewall and through grommet to toggle switch.

(7) Connect red and green wires to toggle switch (fig. 1-17).

(8) Cut leads to dimmer switch and install tap connectors in four places.

(9) Connect four leads to toggle switch.

(10) Position toggle switch bracket in a suitable location on bottom edge of instrument panel (fig. 1-18). Drill holes and install bracket with self-tapping screws.

(11) Affix decal to face of mounting bracket and install toggle switch.

(12) Tape all connections in wiring installation.

(13) Connect negative battery cable and test installation.

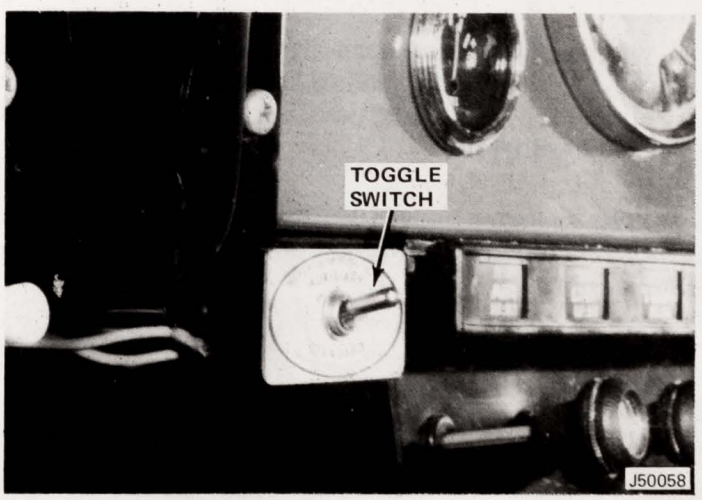


Fig. 1-18 Toggle Switch Installation

SNOW PLOW POWER PACKS

ELECTRONIC POWER PACK MODELS E-46, E-47, and E-48

General

These power packs combine the upper electrolift unit with an all-electric control system. Hydraulic plow lift and angling cylinder operations are controlled by electric solenoid valves positioned by toggle switches mounted on the instrument panel. A pilot-operated solenoid, mounted under the hood, supplies battery power to energize the pump motor.

Capabilities of these units vary from raising and lowering of the plow to raising, lowering, holding, angling of the plow and raising, holding and lowering of pull plow, depending on the number of solenoids in the power pack unit.

Before the electronic power pack is disassembled for repair or replacement of components, be sure that all general maintenance and troubleshooting procedures have been performed.

If the unit is to be overhauled, it is recommended that the master seal kit be used. This kit contains all seals necessary to rebuilding. The kit also contains one quart of hydraulic fluid. Individual seal kits are also available for specific applications.

Prior to disassembly, drain fluid from reservoir by removing pressure relief valve from cover. Clamp base firmly into vise and proceed with disassembly.

Installation

NOTE: *Installation for Electronic Power Pack Models E-46 and E-47 are the same as for E-48 except for fewer components.*

(1) Disconnect negative battery cable.

(2) Attach lift unit to lift frame and lift arm using bolts and locknuts (fig. 1-19). Tighten bolts to 30 to 40 foot-pounds torque.

(3) Attach power angling rams to A-frame and sector (fig. 1-20). Tighten bolts to 30 to 40 foot-pounds torque.

(4) Install rigid ell to right-hand angling ram and swivel ell to lift unit (fig. 1-21).

(5) Install hose assembly to right-hand angling ram and lift unit. Connect hose from left-hand angling ram to lift unit.

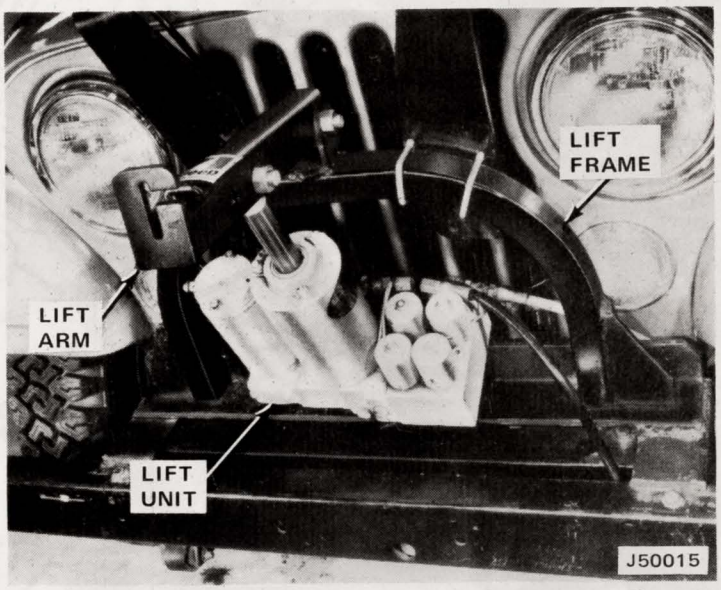


Fig. 1-19 Lift Unit—Lift Frame and Lift Arm Installation

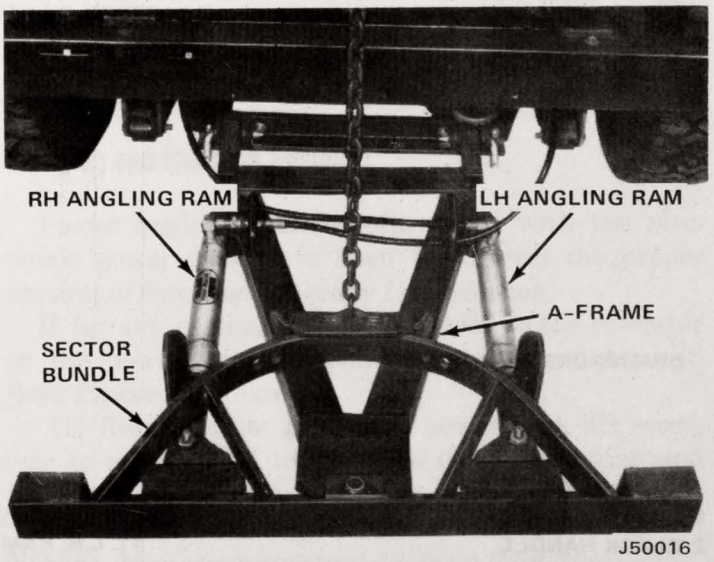
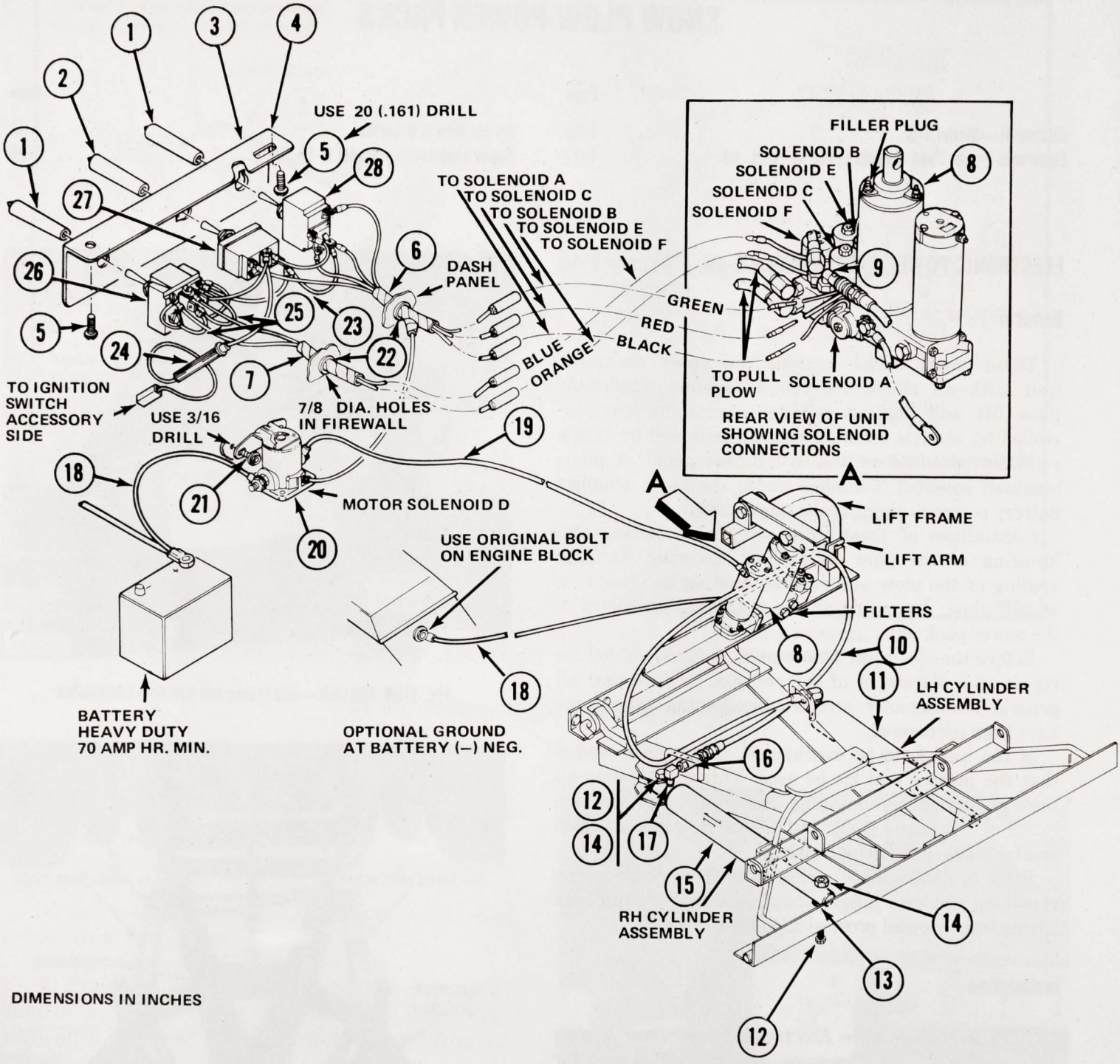


Fig. 1-20 Power Angling Rams and Hoses

(6) Install ground cable from lift unit to existing bolt on engine.

(7) Drill 3/16-inch holes and install solenoid with screws (fig. 1-22).

(8) Install motor cable from lift unit to motor solenoid (fig. 1-21).



DIMENSIONS IN INCHES

1. YELLOW HANDLE
2. BLACK HANDLE
3. DECAL
4. SWITCH BRACKET
5. SELF TAPPING SCREW
6. LIFT AND P.A. HARNESS
7. PULL PLOW HARNESS
8. LIFT UNIT
9. SWIVEL ELL
10. HOSE ASSEMBLY
11. L.H. RAM W/HOSE AND FITTINGS
12. BOLT
13. FLATWASHER
14. LOCKNUT
15. R.H. RAM W/FITTINGS
16. COUPLER
17. RIGID ELL
18. CABLE
19. MOTOR CABLE
20. MOTOR SOLENOID
21. SELF TAPPING SCREW
22. SPLIT BUSHING
23. JUMPER WIRE
24. FUSE ASSEMBLY
25. JUMPER WIRE
26. PULL PLOW RAISE AND LOWER SWITCH
27. ANGLE SWITCH
28. RAISE AND LOWER SWITCH

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Fig. 1-21 Electronic Power Pack Model E-48—Components and Installation

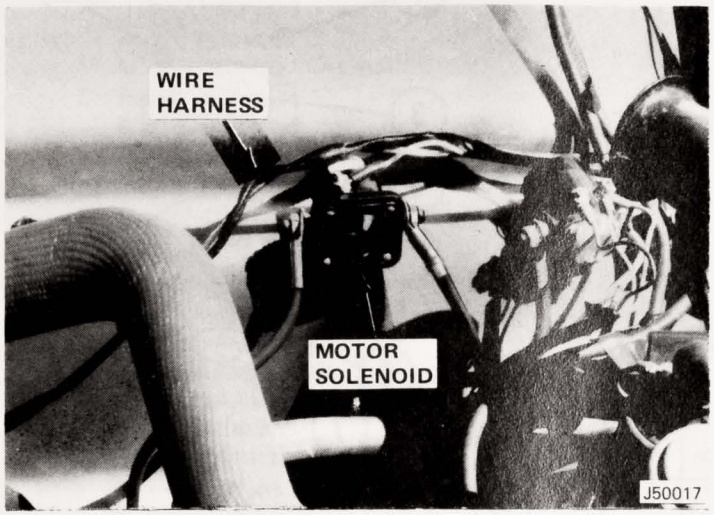


Fig. 1-22 Motor Solenoid Installation

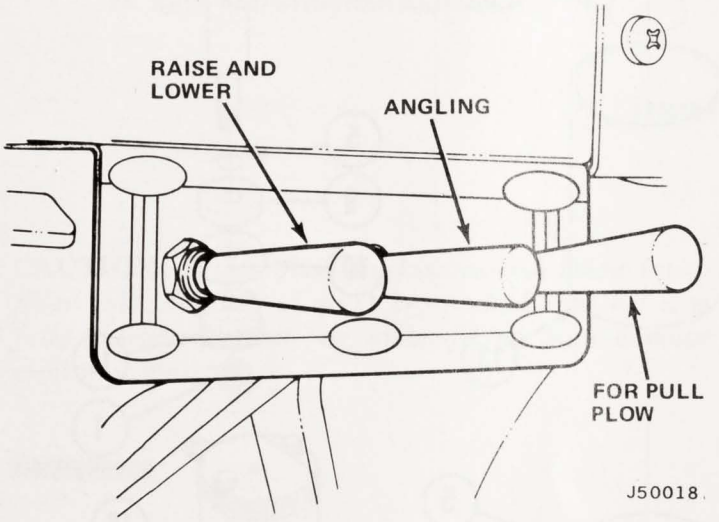


Fig. 1-23 Toggle Switch Installation

(9) Install power cable from motor solenoid to battery.

(10) Drill two 7/8-inch diameter holes in firewall on left-hand side of vehicle. Install two split bushings.

(11) Route lift and power angling wire harness through bushing in left-hand hole and pull plow wire harness through bushing in right-hand hole.

(12) Route lift and power angling wire harness across front of firewall to left-hand side of vehicle to motor solenoid. Make connection at motor solenoid and continue routing wires to front of vehicle.

(13) Plug in connection from wire harnesses to lift unit wiring (wires are color coded) (fig. 1-21).

(14) Attach toggle switch bracket to instrument panel. Using bracket as template, drill two 0.161-inch diameter holes and install toggle switch bracket with self-tapping screws.

(15) Affix decal to toggle switch bracket.

(16) Check connections of wires and wiring harnesses to toggle switches.

(17) Install toggle switches on toggle switch bracket and install handles (fig. 1-23).

(18) Connect fuse assembly and wire to accessory side of ignition switch (fig. 1-21).

(19) Connect negative battery cable and test operation (fig. 1-24).

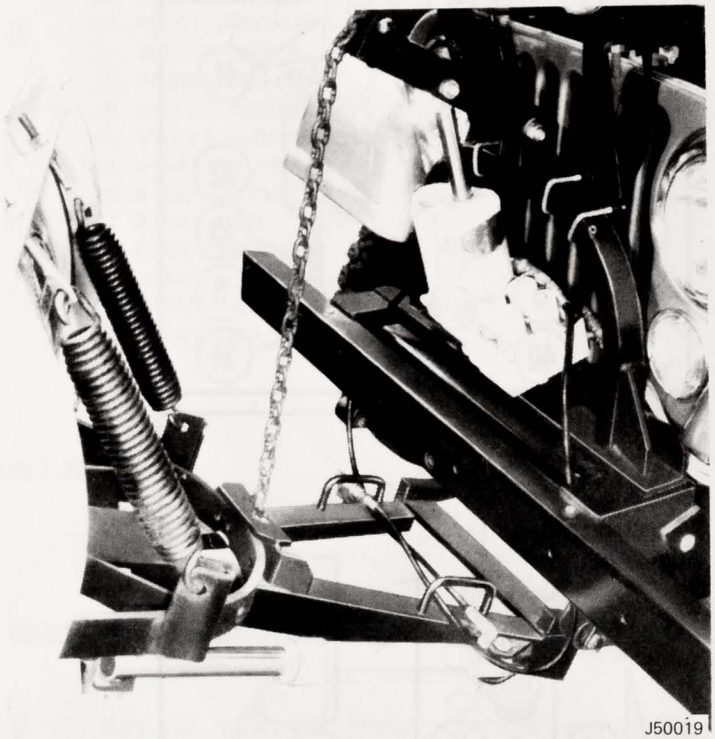


Fig. 1-24 Electronic Power Pack Model E-48 Installation

Charging and Bleeding System

Power angling cylinders furnished with the electronic power pack have been filled with the proper amount of fluid and are ready for operation.

If for any reason, oil is to be added to the reservoir or the power angling cylinders, they must be bled first. Proceed as follows.

(1) Remove filler plug from power pack lift reservoir to enable fluid to be added during charging and bleeding (fig. 1-25).

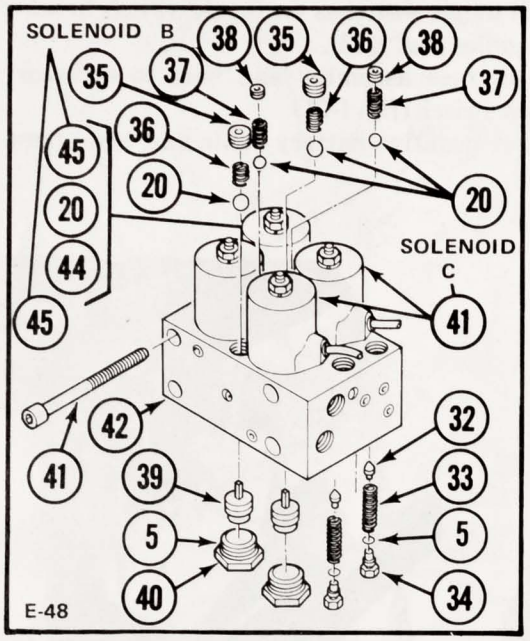
NOTE: *Maintain a constant check on fluid level.*

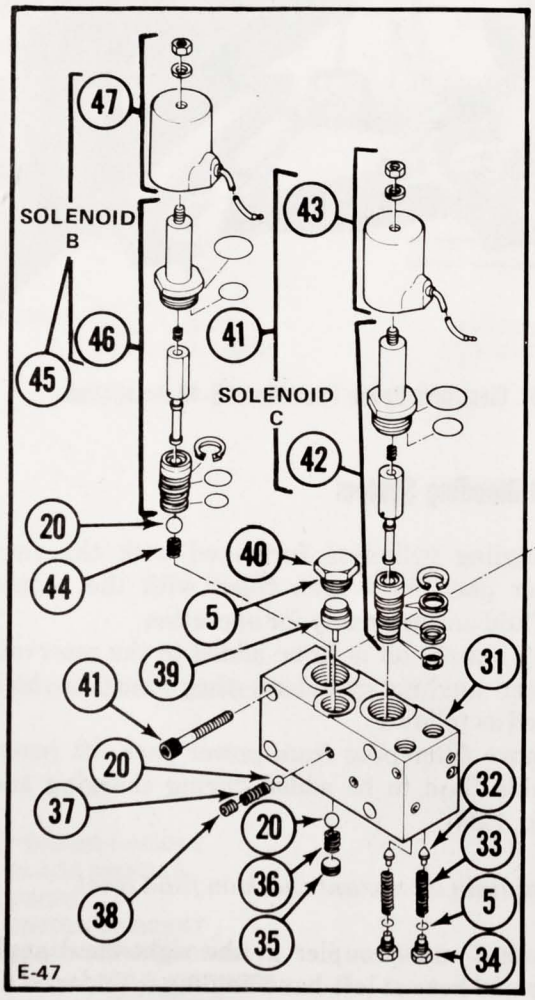
(2) Loosen female coupler at the right-hand angling cylinder and hose at left-hand angling cylinder.

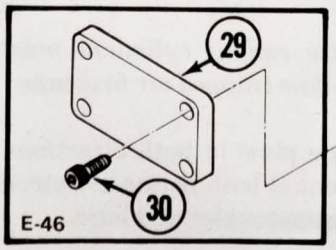
NOTE: *Base end of cylinders must be higher than rod end to allow trapped air to escape.*

(3) Angle plow in both directions repeatedly, until fluid leaks out at both points in a steady flow.

(4) Tighten coupler and hose.







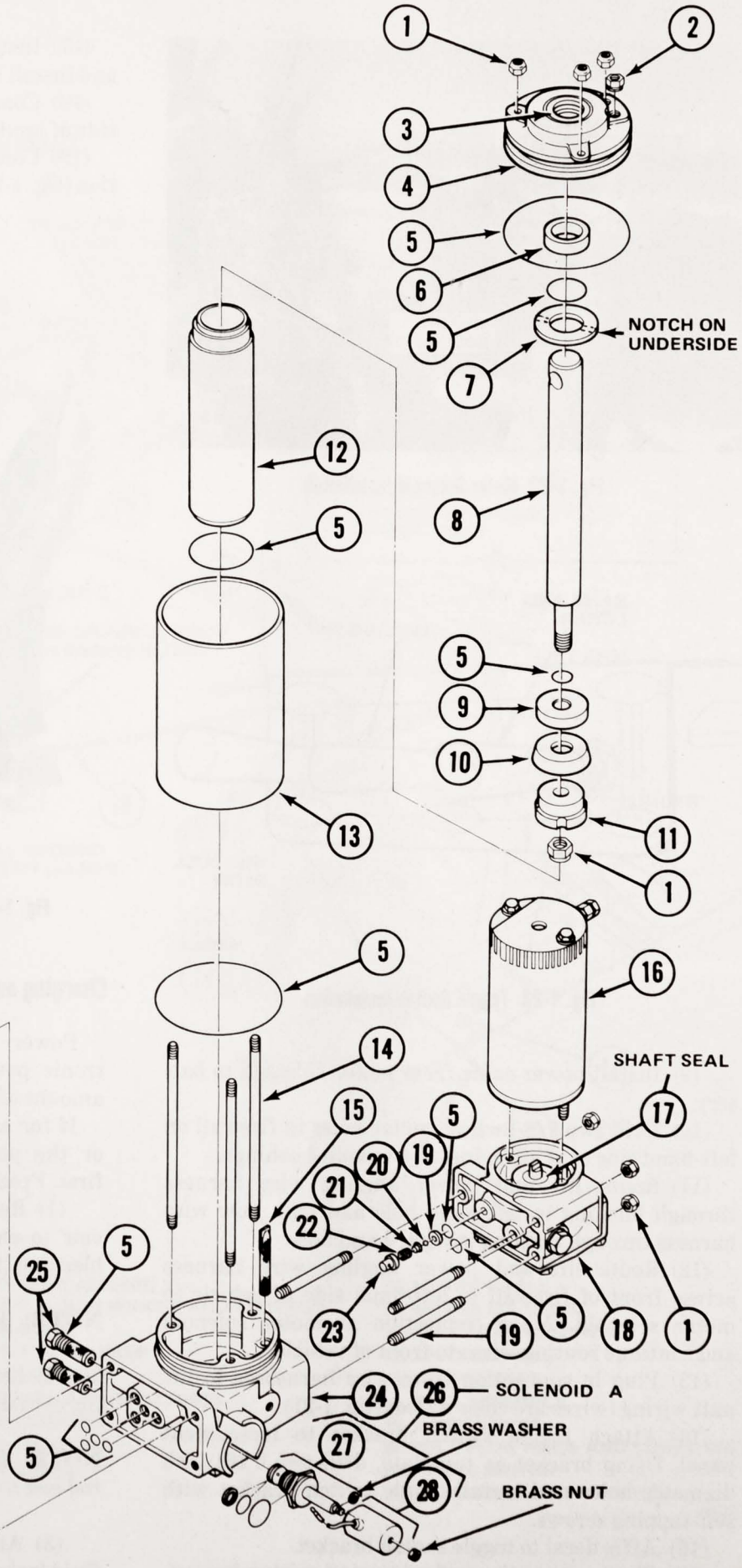


Fig. 1-25 Electronic Power Pack—Exploded View

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1. LOCKNUT
2. FILLER PLUG
3. RAM SEAL
4. COVER AND SEAL ASSEMBLY
5. O-RING
6. SLEEVE
7. WASHER
8. RAM ASSEMBLY
9. PISTON
10. PACKING CUP
11. PISTON FOLLOWER
12. CYLINDER
13. CYLINDER TANK/RESERVOIR
14. STUD
15. BASE STRAINER
16. PUMP AND MOTOR ASSEMBLY
17. SHAFT SEAL
18. PUMP ASSEMBLY
19. INSERT VALVE
20. BALL
21. SPRING GUIDE
22. SPRING
23. CHECK VALVE RETAINER
24. BASE AND STRAINER ASSEMBLY
25. FILTER ASSEMBLY
26. 2-WAY SOLENOID
27. 2-WAY VALVE
28. 2-WAY COIL
29. END PLATE
30. SCREW
31. VALVE BLOCK
32. X-OVER POPPET
33. X-OVER SPRING
34. PLUG END
35. PRESSURE PLUG
36. PILOT CHECK SPRING
37. SPRING CHECK
38. PRESSURE PLUG
39. PISTON ASSEMBLY
40. VALVE BLOCK PLUG
41. 4-WAY SOLENOID
42. 4-WAY VALVE
43. 4-WAY COIL
44. CHECK SPRING
45. 3-WAY SOLENOID
46. 3-WAY VALVE
47. 3-WAY COIL

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Legend For Figure 1-25

CAUTION: *Proper fluid level is one inch below top of filler hole. Fluid level must be checked with lift arm fully retracted. Over- or under-filling may damage electronic power pack.*

Maintenance

Cleanliness should be stressed when system is installed, serviced, or repaired. Maximum performance and efficiency requires that the vehicle's electrical system be properly maintained.

- Battery terminals must be cleaned.
- Electrical connections must be tight.
- Electrical system must be functioning to specifications (refer to Jeep Technical Service Manual).

Troubleshooting Electronic Power Packs E-46, 47, and 48

When encountering malfunctions in model E-46, E-47 or E-48 Power Packs, refer to troubleshooting guide before disassembling.

Figure 1-26 shows the operation of the motor and solenoids in the power pack. The top two diagrams apply to the E-46, E-47 and E-48 model electronic power packs. The middle two diagrams apply to the E-47 and E-48 models. The bottom two diagrams apply only to the E-48 model.

Disassembly and Inspection

(1) Remove locknuts from reservoir cover (fig. 1-25).

(2) Remove cover assembly. Check for casting cracks or damage (fig. 1-27). Inspect seal for cuts.

(3) Remove ram and piston. Check nylon sleeve (fig. 1-25), piston, and piston follower for excessive wear (fig. 1-27).

(4) Inspect cylinder for scoring and pitting in bore.

(5) Inspect ram for nicks, scratches, rust, and corrosion.

(6) Inspect piston packing cup for wear or a cut sealing lip.

(7) Clean and inspect base strainer(fig. 1-25).

(8) Replace all O-rings at assembly.

(9) Loosen motor attaching bolts. Do not remove bolts from motor assembly.

NOTE: *Be sure that motor end plate is held in place during removal.*

(10) Temporarily install two 1/4-20 nuts on motor attaching bolts to keep motor intact.

NOTE: *Both Prestolite and American Bosch motors are used. Prestolite can be identified by a domed top cover and the name stamped on the body. American Bosch motors have a flat top cover and no identifying marks.*

Electronic Power Pack Models E-46, E-47 and E-48 Troubleshooting Guide

Model	Condition	Possible Cause	Correction
ALL	MOTOR DOES NOT OPERATE	(1) Discharged or defective battery.	(1) Recharge or replace battery.
		(2) Loose or corroded electrical connections.	(2) Clean and tighten electrical connections.
		(3) Inoperative solenoid switch.	(3) Replace solenoid switch.
		(4) Malfunctioning control switch	(4) Replace control switch.
		(5) Malfunctioning motor.	(5) Repair or replace motor.
ALL	PLOW DOES NOT LOWER	(1) No current to "A" coil.	(1) Locate malfunction and repair.
		(2) "A" cartridge jammed in closed position.	(2) Clean or replace "A" cartridge.
		(3) Inoperative "A" coil.	(3) Replace "A" coil.
E-46 and E-46H	PLOW CREEPS DOWN	(1) Leaking "A" cartridge.	(1) Clean or replace "A" cartridge.
		(2) Leaking "A" cartridge O-ring.	(2) Replace O-ring.
		(3) Leaking pump check valve.	(3) Clean or replace pump check valve.
		(4) Leaking ram packing cup.	(4) Replace ram packing cup.
		(5) Leaking O-ring at bottom of lift cylinder.	(5) Replace O-ring.
E-46 and E-46H	PLOW DOES NOT LIFT OR LIFTS SLOWLY — MOTOR OPERATES	(1) Low hydraulic fluid level.	(1) Add fluid to proper level.
		(2) Discharged battery.	(2) Recharge battery.
		(3) Loose or corroded electrical connections.	(3) Clean and tighten electrical connections.
		(4) Leaking or open "A" cartridge.	(4) Clean or replace "A" cartridge.
		(5) Malfunctioning motor.	(5) Repair or replace motor.
		(6) Malfunctioning pump.	(6) Replace pump.
E-47 E-47H	PLOW CREEPS DOWN	(1) Leaking "A" cartridge.	(1) Clean or replace "A" cartridge.
		(2) Leaking "A" cartridge O-ring.	(2) Replace O-ring .
		(3) Leaking "B" check valve.	(3) Clean or replace "B" check valve. .
		(4) Leaking ram packing cup.	(4) Replace ram packing cup.
		(5) Leaking O-ring at bottom of lift cylinder.	(5) Replace O-ring.
E-47 E-47H	PLOW DOES NOT LIFT OR LIFTS SLOWLY — MOTOR OPERATES	(1) Low hydraulic fluid level.	(1) Add fluid to proper level.
		(2) Discharged battery.	(2) Recharge battery.
		(3) Leaking or open "A" cartridge.	(3) Clean or replace "A" cartridge.
		(4) No current to "B" coil.	(4) Locate malfunction and repair.
		(5) Inoperative "B" coil.	(5) Replace "B" coil.
		(6) Malfunctioning motor.	(6) Repair or replace motor.
		(7) Malfunctioning pump.	(7) Replace pump

Electronic Power Pack Models E-46, E-47 and E-48 Troubleshooting Guide

Model	Condition	Possible Cause	Correction
E-47 E-47H and E-48	PLOW DOES NOT ANGLE RIGHT — MOTOR OPERATES	(1) Improper coupler engagement.	(1) Engage coupler properly.
		(2) Mechanical bind or interference.	(2) Eliminate mechanical bind or interference.
		(3) Malfunctioning coupler.	(3) Repair or replace coupler.
		(4) No current to "C" coil.	(4) Locate malfunction and repair.
		(5) Inoperative "C" coil.	(5) Replace "C" coil.
		(6) Inoperative "C" cartridge.	(6) Clean or replace "C" cartridge.
		(7) Leaking or open crossover relief valve.	(7) Clean or replace crossover relief valve.
E-47 E-47H and E-48	PLOW DOES NOT ANGLE LEFT — MOTOR OPERATES	(1) Improper coupler engagement.	(1) Engage coupler properly.
		(2) Mechanical bind or interference.	(2) Eliminate mechanical bind or interference.
		(3) Malfunctioning coupler.	(3) Repair or replace coupler.
		(4) Leaking or open crossover relief valve.	(4) Clean or replace crossover relief valve.
E-47 E-47H and E-48	PLOW WILL NOT ANGLE — MOTOR OPERATES	(1) Improper coupler engagement.	(1) Engage coupler properly.
		(2) Mechanical bind or interference.	(2) Eliminate mechanical bind or interference.
E-47 E-47H and E-48	PLOW WILL NOT HOLD IN ANGLED POSITION	(1) Air in cylinders and hoses.	(1) Bleed cylinders and hoses.
		(2) Leaking "C" cartridge O-rings.	(2) Replace O-rings.
		(3) Leaking or open pilot check valve.	(3) Clean or replace pilot check valve.
		(4) Leaking crossover relief valve.	(4) Clean or replace crossover relief valve.
		(5) Crossover relief valve opening at too low a pressure.	(5) Replace crossover relief valve.
E-48	PULL PLOW DOES NOT LIFT OR LIFTS SLOWLY — MOTOR OPERATES	(1) Low hydraulic fluid level.	(1) Add fluid to proper level.
		(2) Discharged battery.	(2) Recharge battery.
		(3) No current in "B1" coil.	(3) Locate malfunction and repair.
		(4) Inoperative "B1" coil.	(4) Replace "B1" coil.
		(5) Malfunctioning motor.	(5) Repair or replace motor.
		(6) Malfunctioning pump.	(6) Replace pump.
E-48	PULL PLOW DOES NOT LOWER	(1) No current to "C1" coil.	(1) Locate malfunction and repair.
		(2) Inoperative "C1" coil.	(2) Replace "C1" coil.
E-48	PULL PLOW CREEPS DOWN	(1) Leaking "C1" check valve.	(1) Clean or replace "C1" check valve.
		(2) Leaking "B1" check valve.	(2) Clean or replace "B1" check valve.
		(3) Defective hydraulic ram.	(3) Replace hydraulic ram.

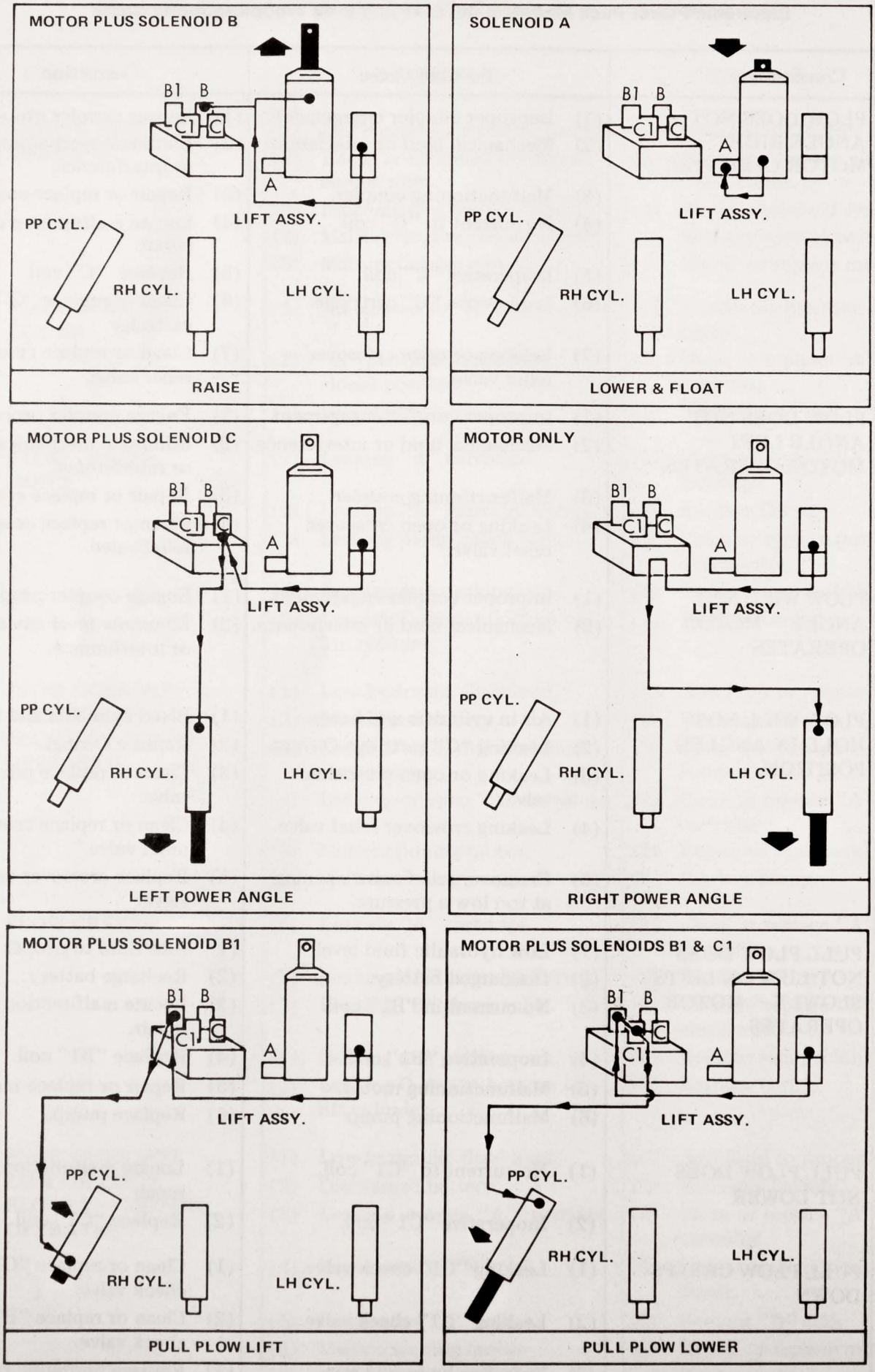

Fig. 1-26 Motor and Solenoid Valve Function Diagram

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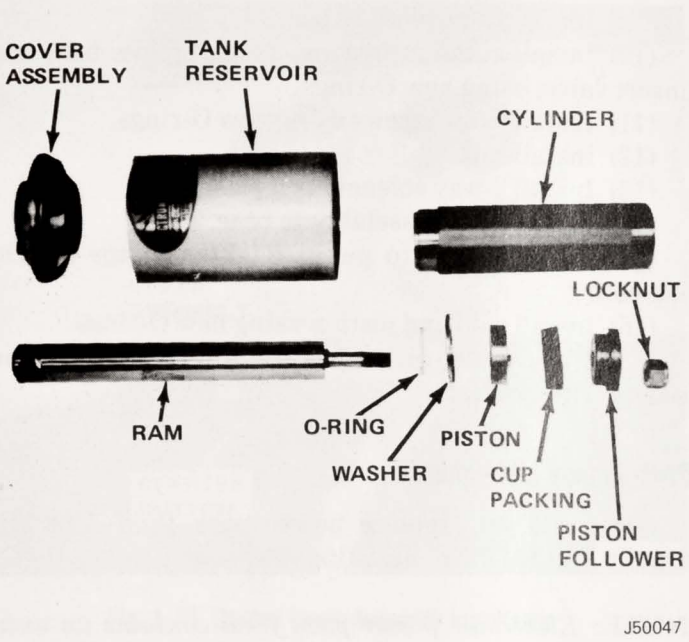


Fig. 1-27 Cover Assembly, Tank, Ram, and Cylinder

NOTE: *Do not disassemble pump. Proper assembly and adjustment cannot be accomplished without special tools and instruments.*

(11) Remove pump drive shaft seal (if damaged) with a pointed tool (fig. 1-25).

(12) Dip new seal in oil and slip over pump shaft with lip down.

(13) Press seal into pump housing and flush to 1/32 inch below face of boss.

(14) Remove 2-way solenoid A from base and inspect for external damage.

(15) Remove coil and test for electrical continuity. Nominal coil resistance is 8.5 ohms.

(16) Remove and clean filter assembly screens with solvent and compressed air. Discard O-rings.

(17) Remove insert valve, ball, spring guide, spring, and retainer from base (fig. 1-28). Inspect for damage or dirt. Discard O-rings.

(18) Remove socket-head screws and remove valve block from base (fig. 1-25).

(19) Remove 3-way solenoid B with Solenoid Socket Wrench J-25399. Remove ball and spring from valve block. Clean solenoid and inspect for external damage.

(20) Disassemble 3-way valve. Discard O-rings.

(21) remove and clean 4-way solenoid C valve with Solenoid Socket Wrench J-25399. Inspect solenoid for external damage.

(22) Disassemble 4-way valve. Discard O-rings and nylon retaining rings (fig. 1-29).

(23) Test coils and 4-way valve for electrical continuity. Normal coil resistance is 3.5 ohms.

(24) Remove plug and piston assembly from valve block (fig. 1-25).

(25) Inspect piston bore for foreign material and scratches. Piston must move freely in bore.

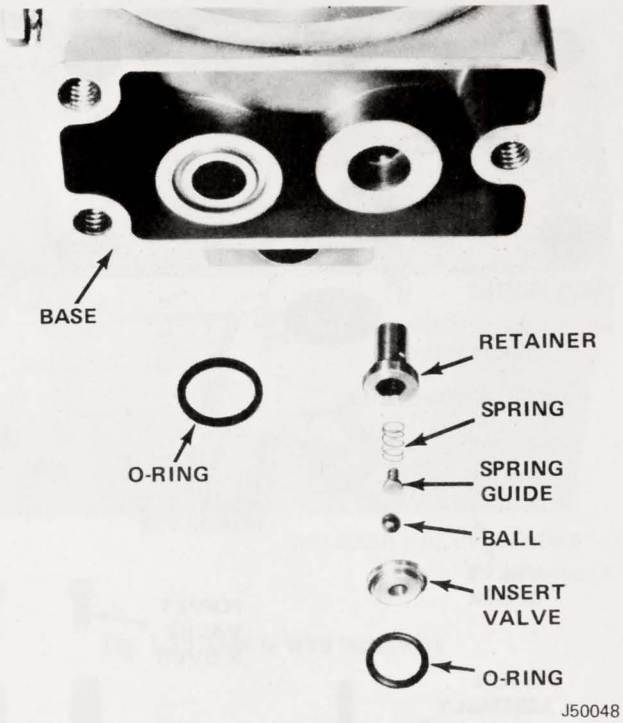


Fig. 1-28 Insert Valve—Exploded View

CAUTION: *Pressure plugs are spring loaded and care must be used during removal.*

(26) Remove pressure plug, spring, and ball from bottom of valve block.

(27) Inspect spring for damage and ball seat for nicks. Discard O-rings.

(28) Remove plugs.

(29) Remove O-rings, springs, and poppets (fig. 1-30). Inspect for external damage. Discard O-rings.

(30) Seat poppets if necessary after block is cleaned.

(31) Remove pressure plug, spring, and ball. Inspect for damage.

(32) With all parts removed from block, clean block with compressed air to remove foreign particles.

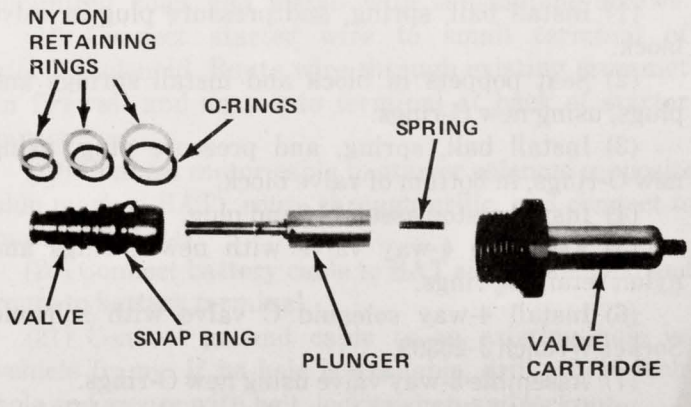


Fig. 1-29 Four-Way Valve Assembly—Exploded View

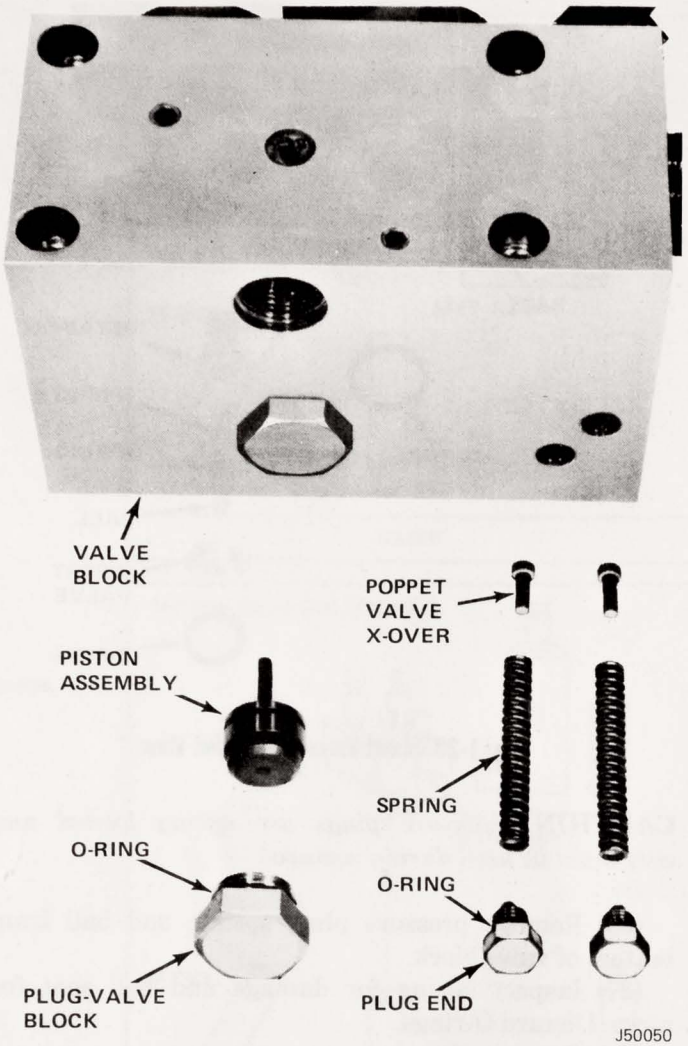


Fig. 1-30 Piston Assembly and Poppet Valves—Exploded View

Assembly

NOTE: *Before assembly, be sure all components are clean and free of dirt, dust, and other foreign matter. Use new gaskets and seals during assembly. Apply gasket compound to all joints that require sealing.*

(1) Install ball, spring, and pressure plug in valve block.

(2) Seat poppets in block and install springs and plugs, using new O-rings.

(3) Install ball, spring, and pressure plug, using new O-rings, in bottom of valve block.

(4) Install piston assembly and plug.

(5) Assemble 4-way valve with new O-rings and nylon retaining rings.

(6) Install 4-way solenoid C valve with solenoid Socket Wrench J-25399.

(7) Assemble 3-way valve using new O-rings.

(8) Install ball, spring, and 3-way solenoid B valve with Solenoid Socket Wrench J-25399.

(9) Install valve block to base.

(10) Install retainer, spring, spring guide, ball, and insert valve, using new O-rings.

(11) Install filter screws using new O-rings.

(12) Install coil.

(13) Install 2-way solenoid A to base.

(14) Install pump assembly to base.

(15) Install motor to pump. Tighten motor attaching bolts.

(16) Install ram and pistion using new O-rings.

(17) Position cover assembly on reservoir and secure with locknuts.

Post-Season Maintenance

(1) Drain and replace power pack fluid. Use Hydraulic Fluid M-1 No. SE 2015134 or equivalent.

NOTE: *Electronic power pack fluid contains an anti-freeze additive which can be used for one season only.*

(2) Clean screen-type filters located in base of unit. Clean with clear solvent and compressed air.

(3) Fully extend lift arm, coat rod with grease, and leave in extended position. This fills the cylinder with fluid and prevents internal rust and corrosion.

(4) Coat exposed portions of power angling cylinder with grease.

ELECTROLIFT MODEL T-6

General

This power pack provides hydraulic plow lift, hold, and lower capabilities. Control of this unit is by cable from the instrument panel to a release valve lever on the electro-hydraulic ram mechanism. A pushbutton switch, mounted on the instrument panel control lever, energizes the pilot solenoid to power the electric motor (fig. 1-31).

Installation

(1) Disconnect negative battery cable.

(2) Install electrolift unit in lift frame, motor toward left side of vehicle. Tighten nuts to 30 to 40 foot-pounds torque (fig. 1-32).

(3) Drill two 1/4-inch holes in control lever assembly mounting flange.

(4) Route cable of control lever assembly through grommet in firewall to engine compartment.

(5) Using control lever assembly mounting flange as template, position on bottom flange of instrument panel (left side) and drill two 3/16-inch holes. Attach control lever assembly with self-tapping screws (fig. 1-31).

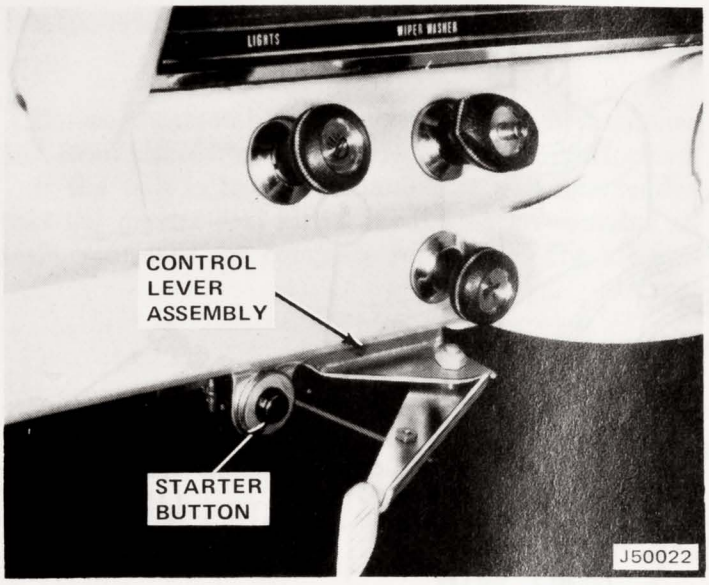


Fig. 1-31 Control Lever Assembly Installation

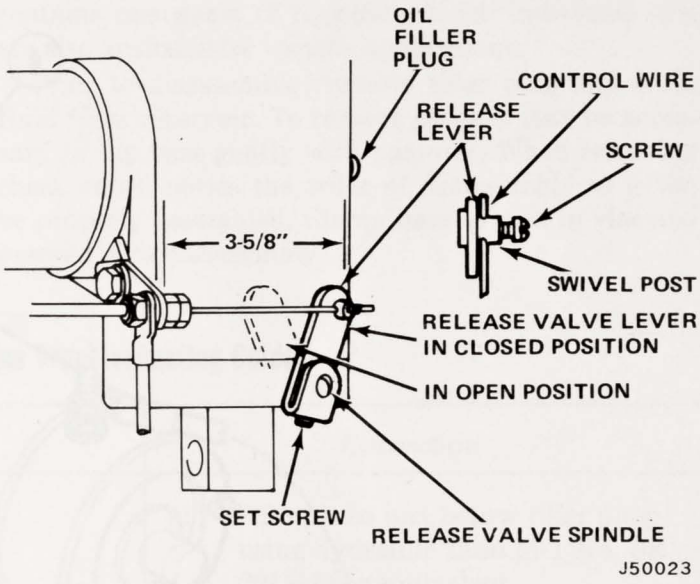


Fig. 1-33 Control Wire Installation

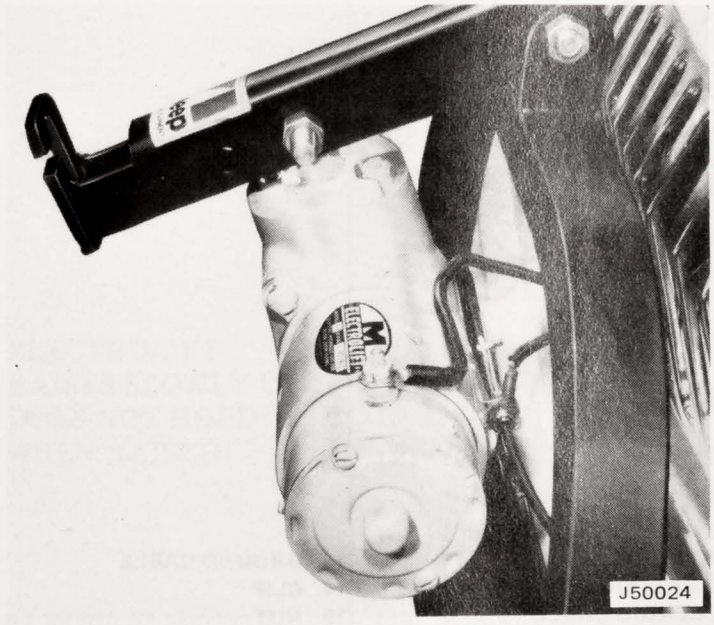


Fig. 1-32 Electrolift Model T-6 Installation

(6) Drill one 1/4-inch hole in front end sheet metal (left side) for control cable.

(7) Insert rubber grommet and route control cable through grommet and grille.

(8) Insert control cable through conduit mounting clip. If conduit is too long, mark the point where it passes through mounting clip.

(9) Loosen lock screw on handle at instrument panel, pull control wire out several feet, and cut conduit as marked.

(10) Thread end of conduit by placing a few drops of oil on conduit and installing conduit nut. Turn nut on conduit to form threads and remove nut.

(11) Fasten control cable to conduit mounting clip by slipping locknut ground cable terminal and lockwasher over end of conduit. Position conduit nut in clip and position conduit, and thread nut on end of conduit.

(12) Push control wire back through conduit until it extends approximately 1 inch beyond nut.

(13) Position wiper ring over wire and into conduit nut, and install wiper ring retainer and thread snugly into conduit nut against wiper ring.

(14) Route control wire through conduit and release valve lever swivel (with release valve lever in closed position as shown in figure 1-33) until it extends 1/2 inch or more beyond swivel. Tighten swivel post setscrew.

(15) Position release lever on control assembly (closed position) and snap starter button into control assembly bracket.

(16) Set control lever 1/16 inch away from starter button and tighten setscrew on handle. Cut off excess wire.

(17) Position motor solenoid under hood so cables reach connections. Using motor solenoid as guide, drill mounting holes and install with self-tapping screws.

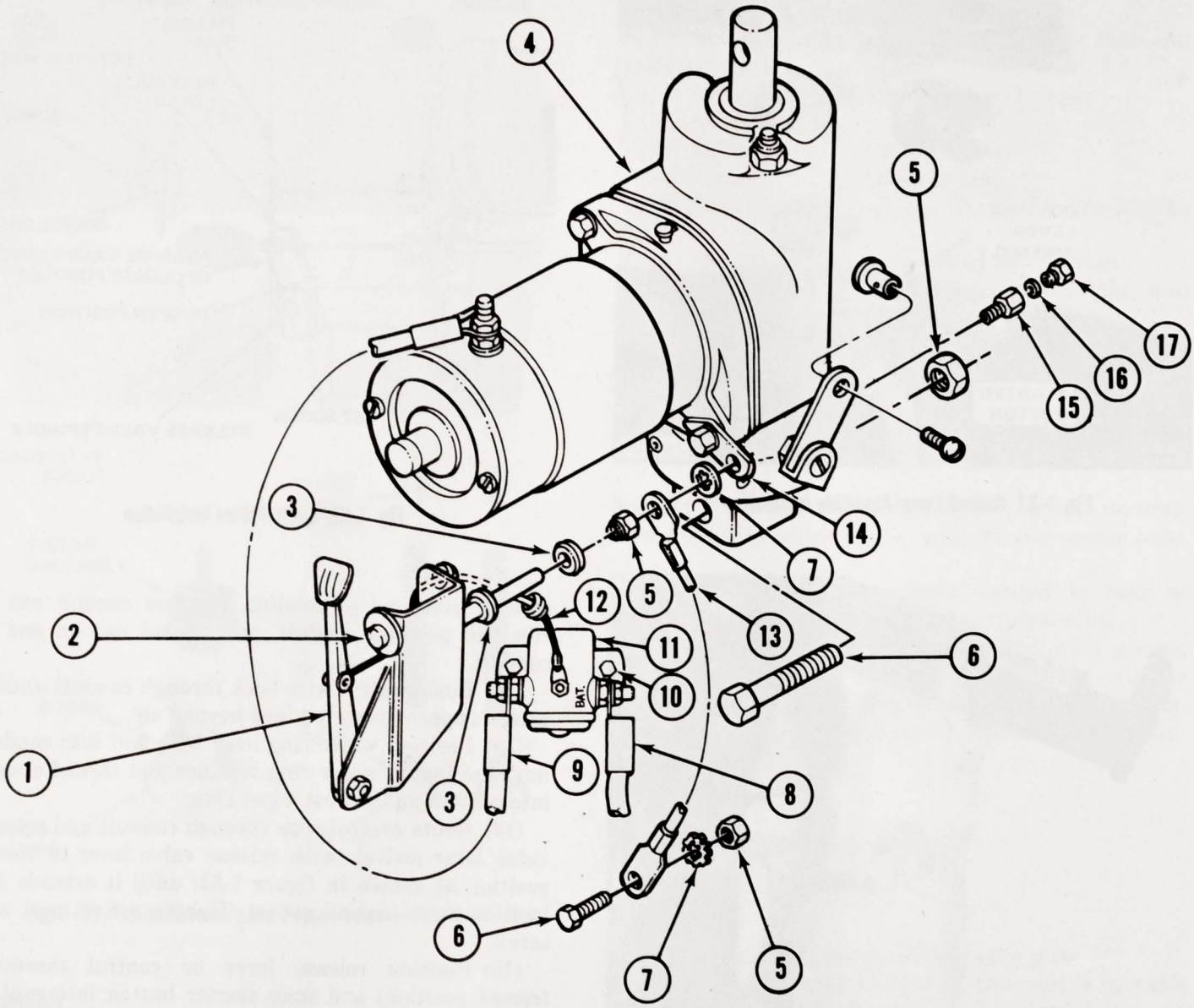
(18) Connect starter wire to small terminal of starter solenoid. Route wire through existing grommet in firewall and snap into terminal at back of starter button.

(19) Connect motor cable to starter solenoid (opposite side marked BAT), route through grille, and connect to motor (fig. 1-34).

(20) Connect battery cable to BAT side of solenoid and route to battery terminal.

(21) Connect ground cable to an existing hole in vehicle frame. If no hole is available, drill a 5/16-inch hole and secure with bolt, lockwasher, and locknut.

(22) Connect negative battery cable and test installation (fig. 1-32).



1. CONTROL LEVER ASSEMBLY
2. STARTER BUTTON
3. GROMMET
4. ELECTROLIFT UNIT
5. LOCKNUT
6. BOLT
7. LOCKWASHER
8. SOLENOID TO BATTERY CABLE
9. MOTOR TO SOLENOID CABLE
10. SCREW
11. SOLENOID
12. STARTER WIRE
13. GROUND CABLE
14. CLIP
15. NUT
16. WIPER RING
17. WIPER PLUG RETAINER

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Fig. 1-34 Electrolift Model T-6—Components and Installation

Maintenance

Cleanliness is stressed when the system is installed, serviced, or repaired. For maximum performance and efficiency, the vehicle electrical system should be properly maintained.

- Battery terminals must be clean.
- Electrical connections must be tight.
- Electrical system must be functioning to specifications (refer to Jeep Technical Service Manual).

Post-Season Maintenance

Drain and replace fluid. Use Hydraulic Fluid M-1 No. SE 2015134 or equivalent.

NOTE: *Fluid contains an antifreeze additive which can be used for one season only.*

When filling power pack, fully extend the lift arm, coat the rod with grease and leave in extended position. This fills cylinder with fluid and prevents internal rust and corrosion.

Troubleshooting Electrolift T-6 System

Before disassembly, be sure that all maintenance and troubleshooting procedures have been performed.

If the unit is to be overhauled, it is recommended that the master seal kit be used. This kit contains all seals necessary for complete rebuilding. The kit also contains one quart of hydraulic fluid. Individual kits are also available for specific applications.

Prior to disassembly, remove filler plug and drain fluid from reservoir. To remove plugs it may be necessary to tap base gently with hammer. When removing check valve, notice the order of disassembly so it can be properly assembled. Clamp base of unit in vise and proceed with disassembly.

Electrolift T-6 Power Pack System Troubleshooting Guide

Condition	Possible Cause	Correction
ELECTROLIFT WILL NOT RAISE — MOTOR OPERATING	(1) Hydraulic fluid level low.	(1) Fill unit to just below filler plug using hydraulic fluid M-1 No. SE 2015134 or equivalent.
	(2) Hydraulic system not primed.	(2) While operating electrolift motor and release lever at the open position, pump lift arm up and down several times by hand. (it may be necessary to perform this operation several times.)
	(3) Valve ball checks stuck	(3) Set release lever in the closed position, raise lift arm, and then apply sharp down pressure to lift arm. Repeat this operation several times.
ELECTROLIFT RAISES SLOWLY OR DOES NOT HOLD WHEN RAISED	(1) Hydraulic fluid level low.	(1) Fill unit to just below filler plug using hydraulic fluid M-1 No. SE 2015134 or equivalent.
	(2) Control wire installation incorrect or out of adjustment.	(2) Reset control wire per installation instructions and fig. 1-33.
	(3) Plunger cup defective.	(3) Replace plunger cup.
ELECTRIC MOTOR WILL NOT OPERATE	(1) Ground cable not properly connected.	(1) Make certain that ground cable is connected and good contact is made. Also make certain that motor base bolt is tight.
	(2) Solenoid not functioning properly.	(2) Check starter button and solenoid (an audible click will be heard at the solenoid when solenoid is working properly. If click is not heard check that all electrical connections are sound. Check starter button with ohmmeter to verify proper operation. If all is in order replace solenoid.
	(3) Improper voltage supply.	(3) Check out vehicle charging system in accordance with appropriate Jeep Technical Service Manual
	(4) Motor faulty.	(4) Replace motor.

Electrolift T-6 Power Pack System Troubleshooting Guide (Continued)

Condition	Possible Cause	Correction
ELECTROLIFT LOWERS SLOWLY	(1) Control wire out of adjustment. (2) Base bolt and lift arm bolts over tightened.	(1) Reset control wire per installation instructions. (2) Bolts must be tightened firmly but not excessively. Loosen bolts and retighten to 30-40 foot pounds.

Disassembly and Inspection

(1) Remove locknuts from top of reservoir (fig. 1-35).

(2) Remove reservoir and motor assembly from base assembly.

(3) Inspect base for cracks, stripped threads, worn mounting hole, or other signs of wear or damage. Replace base if damaged.

(4) Remove base strainer, seat, and O-ring. Clean strainer with solvent and compressed air. Discard O-ring.

(5) Remove plug, valve inlet spring, and ball from bottom of base. Inspect ball for nicks. Install ball and seat by tapping with drift hammer until seat is tight.

(6) Remove plug, O-ring, spring, poppet, retainer, seat, and O-ring from base. Check poppet for nicks.

(7) Loosen setscrew and remove release valve lever. Remove spindle, O-ring, nut, O-ring, ball, ball seat, and O-ring.

(8) Inspect motor cam for rust, wear, or looseness of shaft. Replace if necessary.

(9) Inspect motor shaft seal for leakage. If replacement is required, remove cam using pry bar.

(10) Separate motor from reservoir by removing bolts and washers securing motor to reservoir.

(11) Drive motor shaft seal out of reservoir, working through filler plug opening.

NOTE: *If motor is faulty, it must be replaced as a unit.*

(12) Install cam, pin, and inner pin on motor shaft using round brass rod inserted through filler plug opening.

(13) Remove and inspect pump plunger for excessive wear. Replace pump plunger if faulty.

(14) Inspect pump cylinder in bore for scoring and damaged threads. Install plunger in pump cylinder bore and check for excessive wear or side play.

NOTE: *There should be no side play between cylinder and plunger. Replace pump assembly if this condition exists.*

(15) Inspect pump cap insert bearing surface for excessive wear. Bearing surface should be flat for full contact with cam face. Replace insert if worn concave.

NOTE: *Repairs are not recommended for pump. If inspection indicates parts are faulty, replace pump assembly.*

(16) Inspect reservoir casting for cracks or damage. Replace if defective.

(17) Check bushing for excessive wear with ram plunger installed in bushing. Check for excessive sideplay. It should be snug, if not, replace bushing.

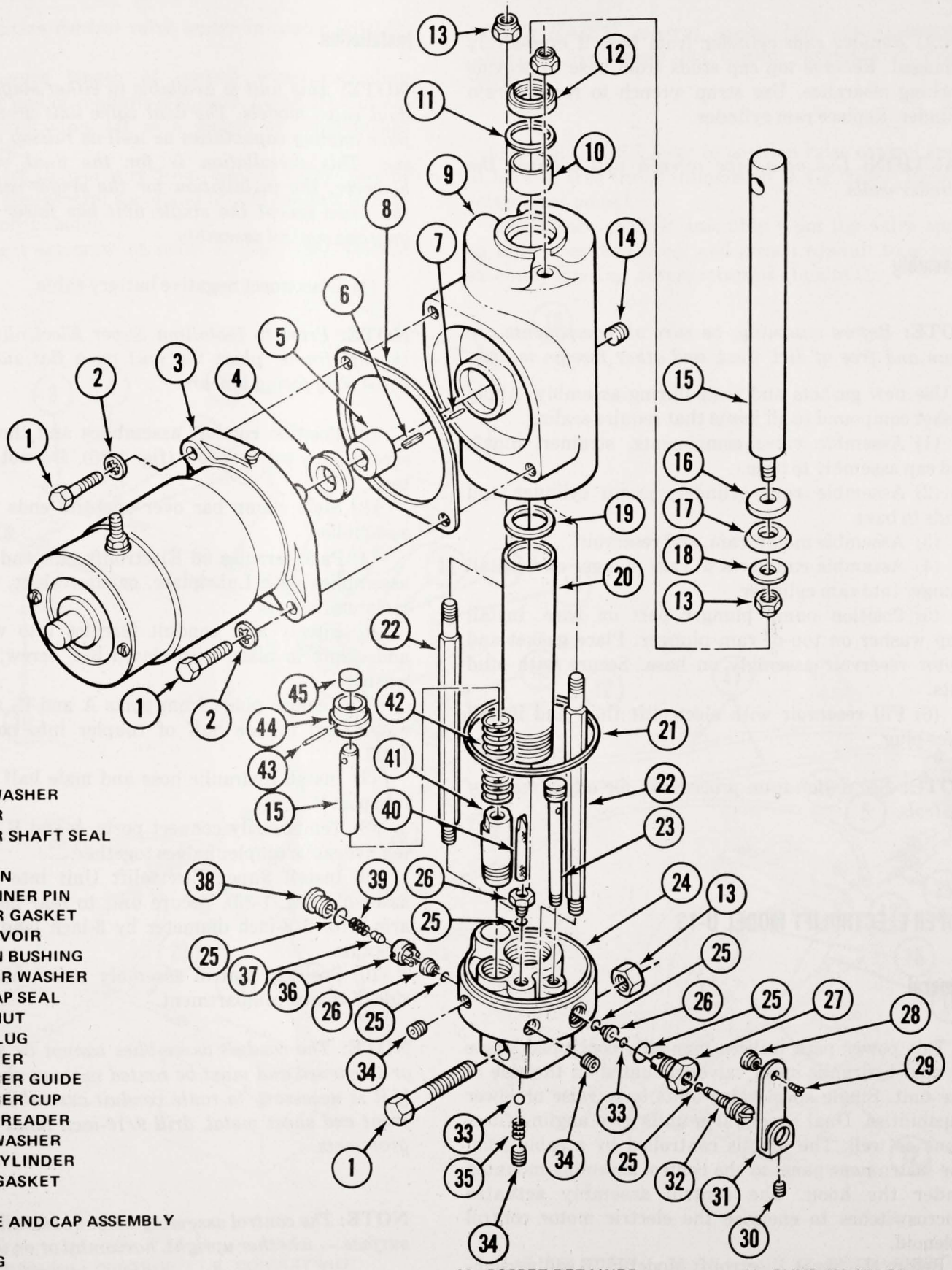
(18) Remove rubber washer and press old bushing out of cap to install new bushing. Install new bushing and check for sliding fit on ram plunger.

NOTE: *Bushing bore may be dressed with emery cloth to aid in fitting the bushing to the ram plunger. Be sure that ram plunger does not bind in the bushing.*

(19) Remove ram plunger and components. Inspect for scoring, rust, pitting, and signs of misalignment. Check for bent condition. Replace if defective.

(20) Inspect ram plunger cup for cuts, distortion, or deterioration. If defective, remove nut and spreader at end of plunger.

NOTE: *Minor nicks, scratches, and scoring may be removed from the ram cylinder bore with an emery cloth. Polish with crocus cloth and clean thoroughly. Burrs can be removed by grinding lightly and then dressing with emery cloth and crocus cloth.*



1. BOLT
2. LOCKWASHER
3. MOTOR
4. MOTOR SHAFT SEAL
5. CAM
6. CAM PIN
7. CAM INNER PIN
8. MOTOR GASKET
9. RESERVOIR
10. NYLON BUSHING
11. RUBBER WASHER
12. TOP CAP SEAL
13. LOCKNUT
14. PIPE PLUG
15. PLUNGER
16. PLUNGER GUIDE
17. PLUNGER CUP
18. CUP SPREADER
19. STOP WASHER
20. RAM CYLINDER
21. BASE GASKET
22. STUD
23. NIPPLE AND CAP ASSEMBLY
24. BASE
25. O-RING
26. SEAT
27. CAGE NUT
28. SWIVEL
29. POST SCREW
30. SET SCREW
31. LEVER
32. SPINDLE
33. BALL
34. PIPE PLUG
35. VALVE INLET SPRING
36. POPPET RETAINER
37. POPPET
38. PLUG
39. SPRING
40. BASE STRAINER
41. PUMP CYLINDER
42. PLUNGER SPRING
43. PIN
44. CAP
45. CAP INSERT

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Fig. 1-35 Electrolift Model T-6—Exploded View

(21) Remove ram cylinder from base if excessively damaged. Remove top cap studs from base to provide working clearance. Use strap wrench to remove ram cylinder. Replace ram cylinder.

CAUTION: *Use of a pipe wrench will collapse the cylinder walls.*

Assembly

NOTE: *Before assembly, be sure all components are clean and free of dirt, dust, and other foreign matter.*

Use new gaskets and seals during assembly. Apply gasket compound to all joints that require sealing.

(1) Assemble valve components, strainer, nipple and cap assembly to base.

(2) Assemble ram cylinder, pump cylinder and studs to base.

(3) Assemble motor, cam, and reservoir.

(4) Assemble cup parts to ram plunger and install plunger into ram cylinder.

(5) Position pump plunger part on base. Install stop washer on top of ram plunger. Place gasket and motor reservoir assembly on base. Secure with stud nuts.

(6) Fill reservoir with electrolift fluid and install filler plug.

NOTE: *See installation procedures for adjustment of controls.*

SUPER ELECTROLIFT MODEL U-13

General

This power pack utilizes manually controlled single or dual hydraulic spool valves mounted on the side of the unit. Single spool valve units have raise or lower capabilities. Dual spool valve units give angling functions as well. The unit is controlled by a cable from the instrument panel to the control assembly mounted under the hood. The control assembly actuates microswitches to energize the electric motor control solenoid.

Before the super Electrolift Model U-13 is disassembled, be sure that all maintenance and troubleshooting procedures have been performed. If the unit is to be overhauled, it is recommended that the master seal kit be used. This kit contains all seals necessary for complete rebuilding of the unit. The kit also contains one quart of hydraulic fluid. Individual kits are available.

Installation

NOTE: *This unit is available in either single valve or dual valve models. The dual valve unit provides snow plow angling capabilities as well as raising and lowering. This installation is for the dual valve unit; however, the installation for the single valve unit is the same except the single unit has fewer parts and only one control assembly.*

(1) Disconnect negative battery cable.

NOTE: *Prior to installing Super Electrolift Unit on the lift frame, place the unit on a flat surface with valve body facing upward.*

(2) Position conduit assemblies and thread clamp screws into valve spools (fig. 1-36). **Do not overtighten.**

(3) Slide clamp bar over opposite ends of conduit assemblies.

(4) **Pack ferrules on Electrolift unit end of conduit assemblies with Lubriplate, or equivalent, to seal out moisture.**

(5) Firmly seat conduit ferrules into valve body and clamp in place with clamp bar, screw, and lockwasher.

(6) Remove plugs from ports A and B, and install nipple and female half of coupler into port A (fig. 1-37).

(7) Install hydraulic hose and male half of coupler into port B.

(8) Temporarily connect ports A and B by attaching hydraulic coupler halves together.

(9) Install Super Electrolift Unit into lift frame assembly (fig. 1-36). Secure unit to rear hole and lift arm with 5/8-inch diameter by 3-inch long bolts and locknuts

(10) Position control assembly under hood on left side of engine compartment.

NOTE: *The conduit assemblies cannot be lengthened or shortened and must be routed without sharp bends. If it is necessary to route conduit assemblies through front end sheet metal, drill 9/16-inch holes and install grommets.*

NOTE: *The control assembly must be installed on a flat surface — whether upright, horizontal or on its side.*

(11) Install control assembly with bolts and locknuts, inserting bolt at point A (fig. 1-38) through switch ground wire terminal.

(12) Route conduit assemblies through front end of vehicle to control assembly.

(13) Position control valve levers in center (HOLD) position.

(14) Measure length of control wires extending beyond the end of conduits (fig. 1-38, detail D). Cut exposed control wires off to a length of 1-1/8 inches (maximum).

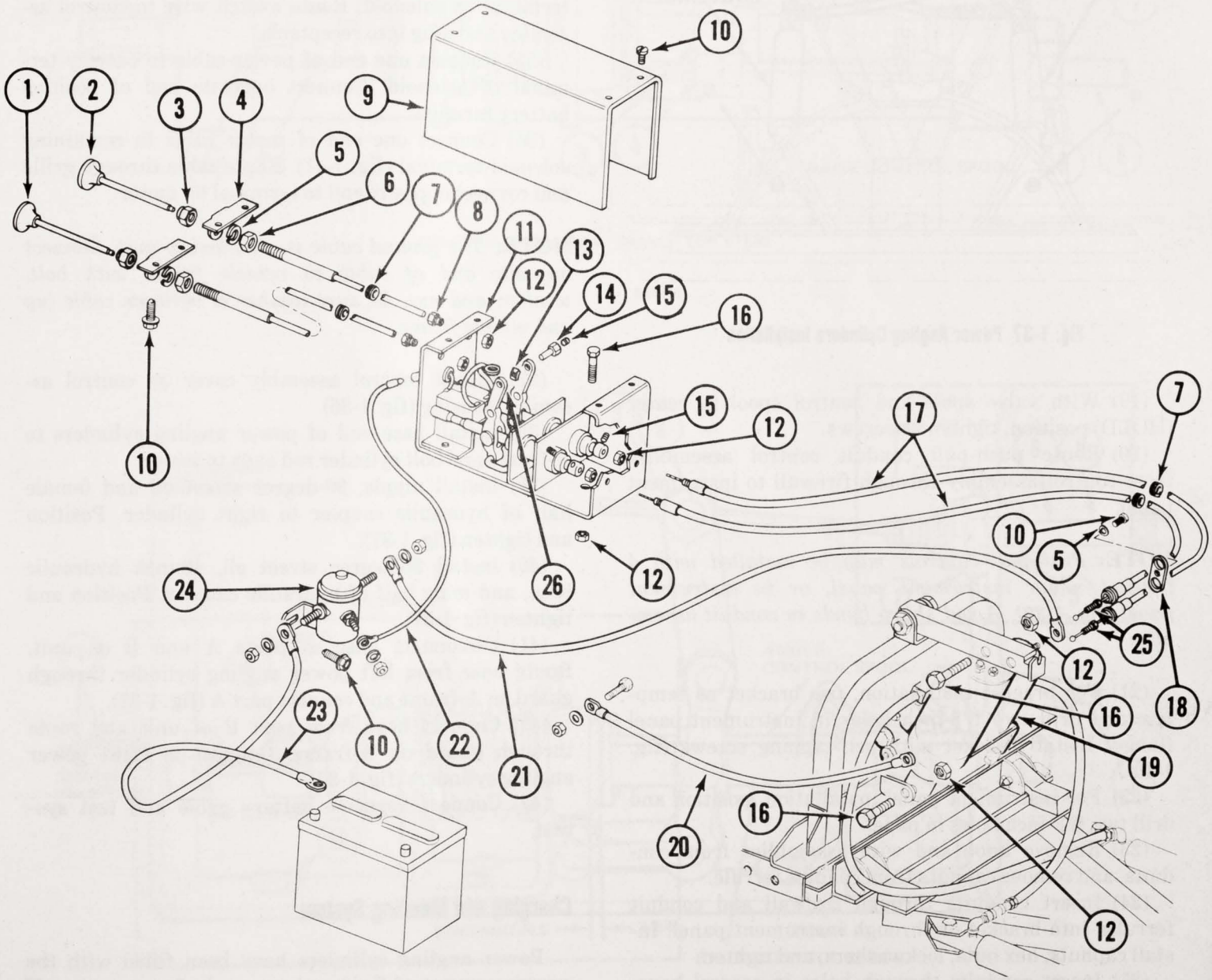
(15) Insert control wire from bottom valve spool of unit into raise control spool and attach conduit to control assembly housing.

(16) Insert setscrew at point C (fig. 1-38). Do not tighten.

NOTE: *RAISE control spool has approximately 7/64-inch free travel (no spring pressure to overcome).*

(17) Pull RAISE lever to position raise control spool at back of free travel (dimension B, fig. 1-38). Tighten setscrew at point C.

(18) Attach conduit assembly from top valve spool on unit to control spool and attach conduit to control assembly housing. Insert setscrew at point C.



1. ANGLE PUSH-PULL CONTROL
2. RAISE PUSH-PULL CONTROL
3. CAP NUT
4. DASH BRACKET
5. LOCKWASHER
6. HEX NUT
7. GROMMET
8. CONDUIT NUT
9. CONTROL ASSEMBLY COVER
10. SCREW
11. CONTROL ASSEMBLY
12. LOCKNUT
13. PUSH-ON NUT
14. SWIVEL POST
15. SET SCREW
16. BOLT
17. CONDUIT ASSEMBLY
18. CLAMP BAR
19. SUPER ELECTROLIFT UNIT
20. GROUND CABLE
21. MOTOR CABLE
22. SWITCH WIRE
23. POWER CABLE
24. SOLENOID
25. CLAMP SCREWS
26. CONTROL VALVE LEVER

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Fig. 1-36 Dual Valve Super Electrolift Model U-13

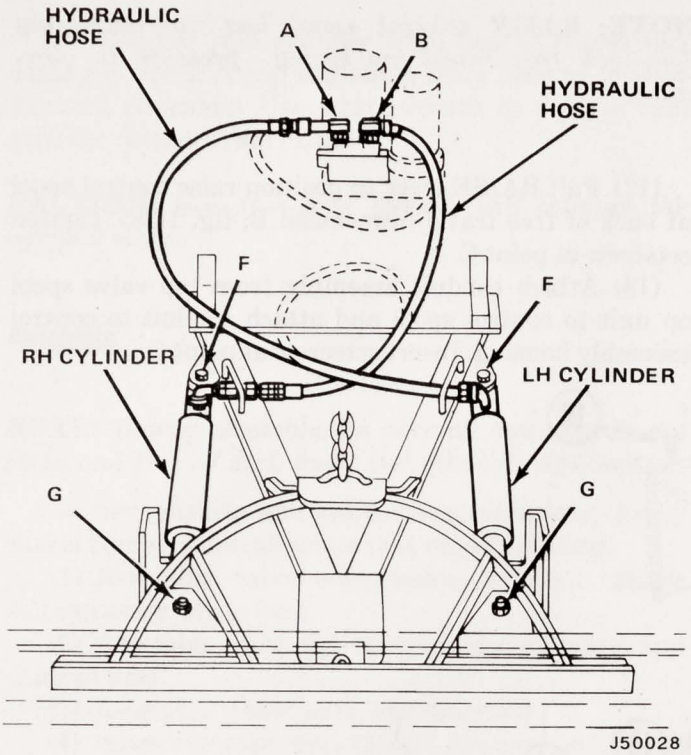


Fig. 1-37 Power Angling Cylinders Installation

(19) With valve spool and control spool in center (HOLD) position, tighten setscrews.

(20) Route push-pull conduit control assemblies from control assembly through firewall to instrument panel.

NOTE: *Push-pull controls may be installed with a bracket under instrument panel, or in instrument panel (fig. 1-39). Avoid sharp bends in conduit assemblies.*

(21) For bracket installation, use bracket as template and drill two 1/8-inch holes in instrument panel flange. Install bracket with self-tapping screws (fig. 1-40).

(22) For instrument panel installation, position and drill two 1/2-inch holes in panel.

(23) Remove knob and wire assemblies from conduits, and remove capnuts from conduit ferrule.

(24) Insert conduits through firewall and conduit ferrules into bracket or through instrument panel. Install capnuts, hex nuts, lockwashers, and tighten.

(25) Insert conduits through holes in control housing and cut off to 7/8 inch (detail E, fig. 1-38).

(26) Pull conduits out of control housing and thread nuts onto conduit (7/8 inch). Insert into housing, thread, and tighten locknuts.

(27) Insert RAISE knob and wire assembly into conduit.

(28) Insert ANGLE knob and wire assembly into conduit.

(29) Install swivel posts and push-on nuts.

(30) Insert raise and angle control wires through posts and adjust knobs to dimensions shown on figure 1-39. Tighten setscrews.

(31) Cut off control wires 1/2 inch beyond swivel posts to allow for future adjustment.

(32) Position solenoid under hood in a location that allows cables to reach their connections.

(33) Using solenoid as template, mark and drill two 3/16-inch holes. Install solenoid using self-tapping screws (fig. 1-36).

(34) Connect terminal end of switch wire to small terminal on solenoid. Route switch wire to control assembly and plug into receptacle.

(35) Connect one end of power cable to battery terminal of solenoid. Connect opposite end of positive battery terminal.

(36) Connect one end of motor cable to remaining solenoid terminal (fig. 1-41). Route cable through grille and connect opposite end to terminal on motor.

NOTE: *The ground cable is attached to unit. Connect opposite end of cable to vehicle frame with bolt, washer, and nut. Be sure washer is between cable lug and vehicle frame.*

(37) Install control assembly cover on control assembly housing (fig. 1-36).

(38) Install base end of power angling cylinders to A-frame and bolt cylinder rod ends to sector.

(39) Install nipple, 90-degree street ell and female half of hydraulic coupler to right cylinder. Position and tighten (fig. 1-37).

(40) Install 90-degree street ell, 42-inch hydraulic hose, and male half of hydraulic coupler. Position and tighten (fig. 1-37).

(41) Disconnect hose at ports A and B on unit. Route hose from left power angling cylinder through guard on A-frame and connect port A (fig. 1-37).

(42) Connect hose from port B of unit and route through guard on A-frame. Connect to right power angling cylinders (fig. 1-37).

(43) Connect negative battery cable and test system.

Charging and Bleeding System

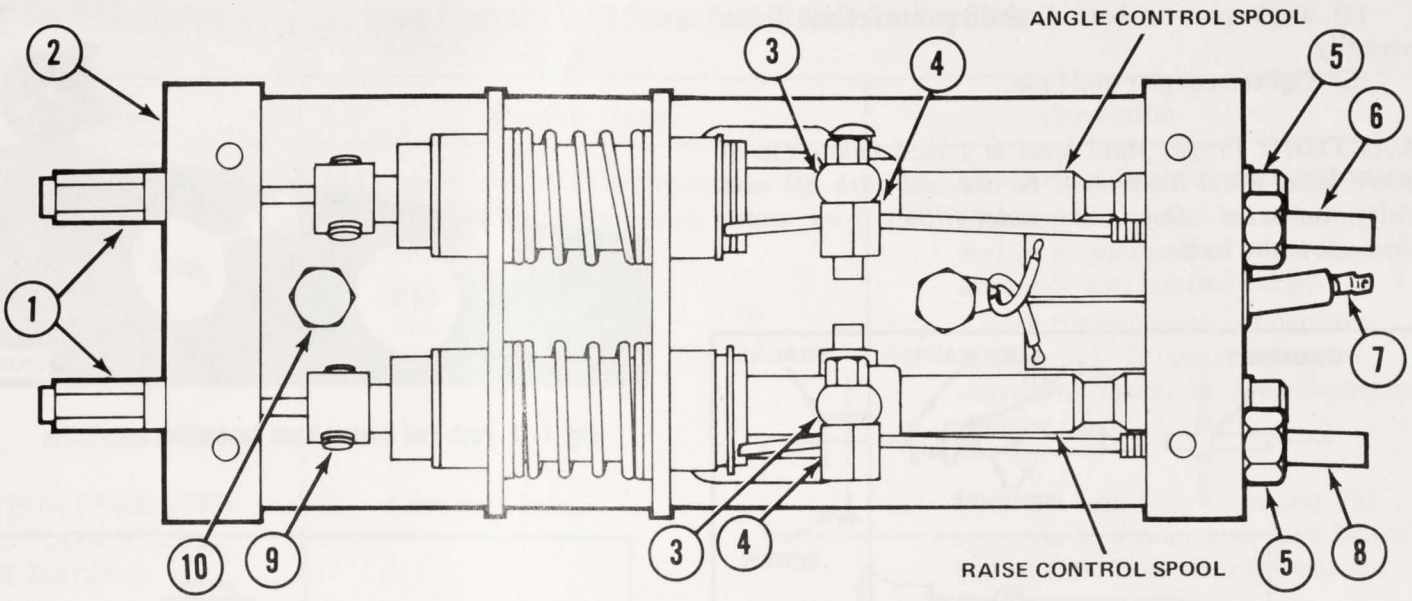
Power angling cylinders have been filled with the proper amount of fluid and are ready for operation. If for any reason it is necessary to add oil or to bleed the cylinders, proceed as follows:

(1) Remove filler plug from reservoir (fig. 1-42).

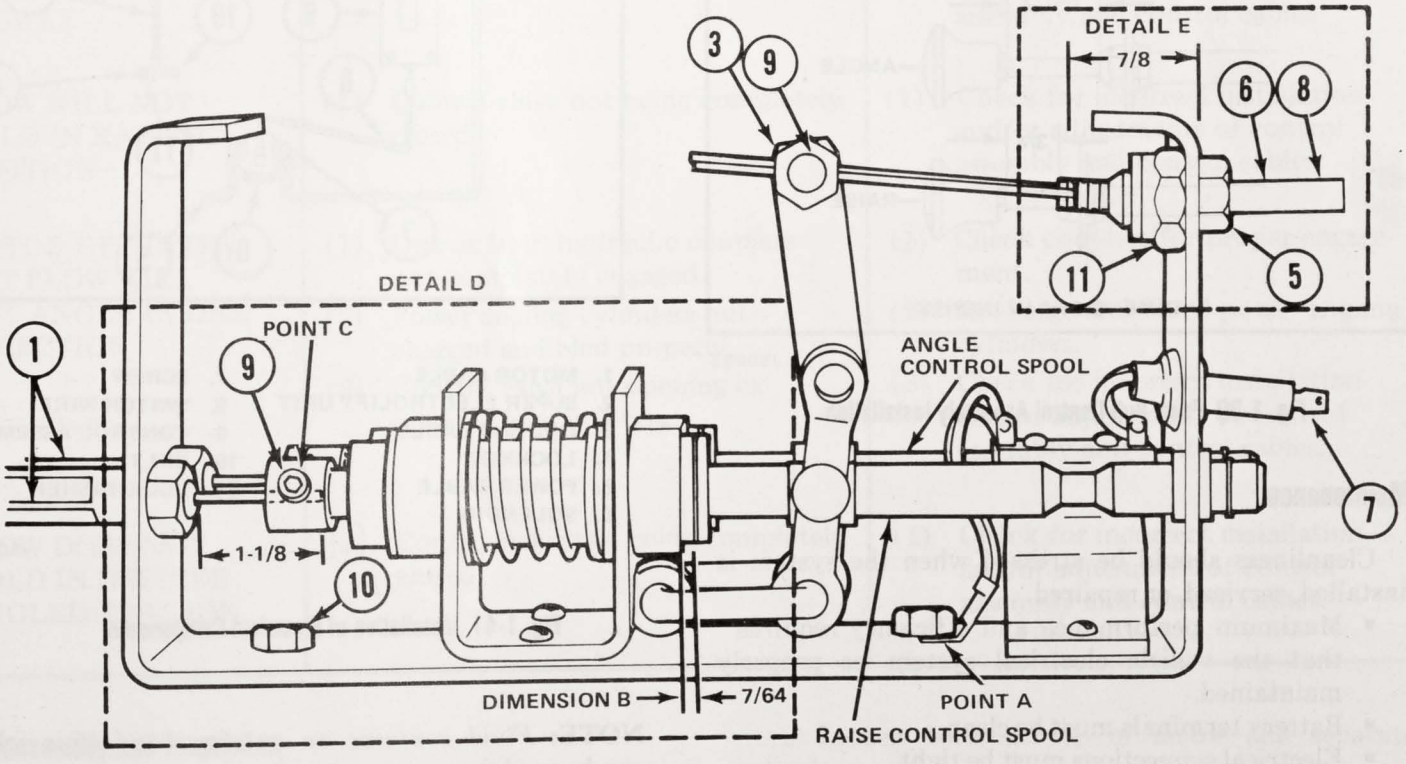
(2) Maintain constant check on fluid level.

(3) Loosen female coupler at right angling cylinder and hose at left angling cylinder.

NOTE: *Base end of cylinders must be higher than rod end to allow trapped air to escape.*



CONTROL ASSEMBLY - DUAL - TOP VIEW



DIMENSIONS IN INCHES

CONTROL ASSEMBLY - DUAL - SIDE VIEW

1. CONDUIT ASSEMBLY
2. CONTROL ASSEMBLY
3. SWIVEL POST
4. PUSH-ON NUT
5. CONDUIT NUT
6. ANGLE PUSH-PULL CONTROL
7. START CABLE
8. RAISE PUSH-PULL CONTROL
9. SETSCREW
10. BOLT
11. LOCKNUT

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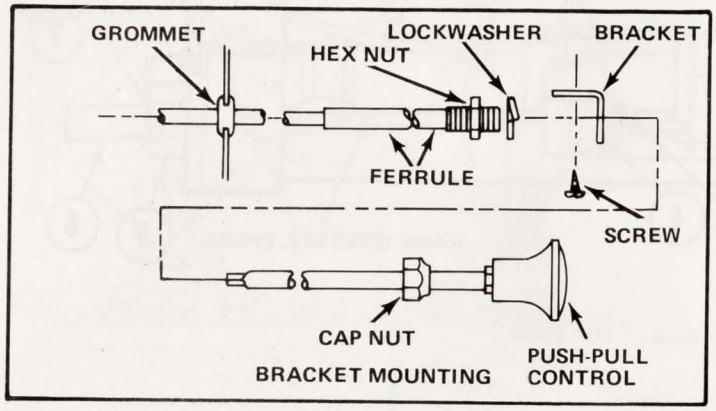
Fig. 1-38 Control Assembly Installation

(4) Angle plow in both directions until fluid flows steadily.

(5) Tighten coupler and hose.

CAUTION: *Proper fluid level is 1 inch below top of filler hose. Fluid level must be checked with lift ram fully retracted. Over- or under-filling may cause damage to the unit.*



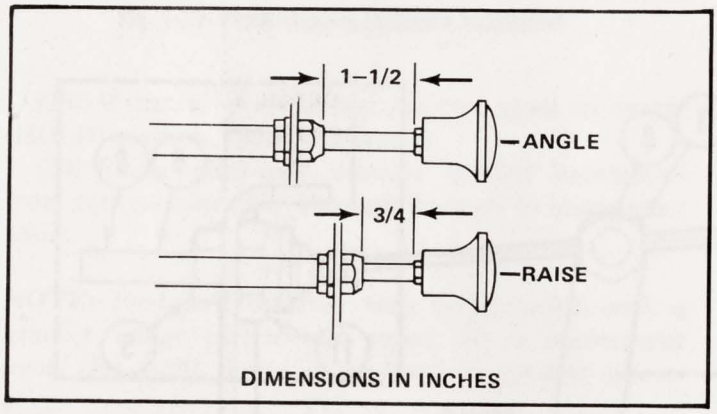


Fig. 1-39 Push-Pull Control Assembly Installation

Maintenance

Cleanliness should be stressed when the system is installed, serviced, or repaired.

- Maximum performance and efficiency requires that the vehicle electrical system be properly maintained.
- Battery terminals must be clean.
- Electrical connections must be tight.
- Electrical system must be functioning to specifications (refer to Jeep Technical Service Manual)

Post-Season Maintenance

(1) Drain and replace fluid. Use Hydraulic Fluid M-1, No. SE 2015134, or equivalent.

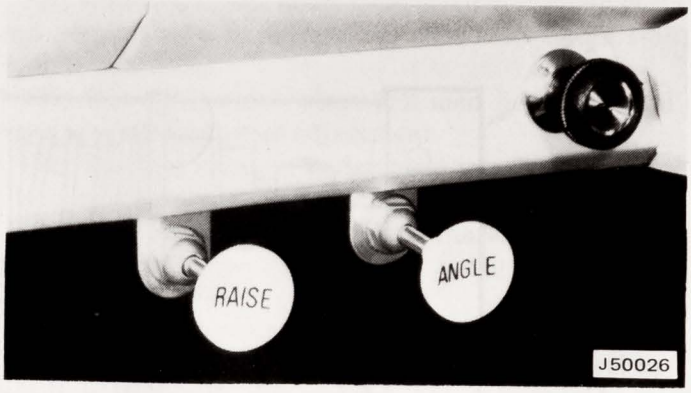
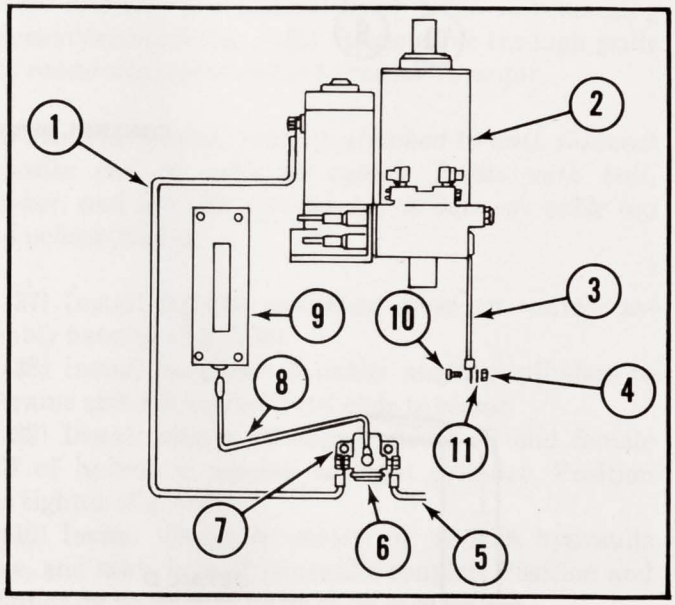


Fig. 1-40 Push-Pull Control Knob Assemblies Installation



1. MOTOR CABLE
2. SUPER ELECTROLIFT UNIT
3. GROUND CABLE
4. LOCKNUT
5. POWER CABLE
6. SOLENOID
7. SCREW
8. SWITCH WIRE
9. CONTROL ASSEMBLY
10. BOLT
11. LOCKWASHER

Fig. 1-41 Installation of Electrical Components

NOTE: *Fluid contains an antifreeze additive which can be used for one season only.*

(2) Fully extend lift arm, coat rod with grease and leave in extended position. This fills cylinder with fluid and prevents internal rust and corrosion.

(3) Coat exposed portions of power angling cylinders with grease.

Super Electrolift U-13 Power Pack Troubleshooting Guide

Condition	Possible Cause	Correction
MOTOR WILL NOT OPERATE	(1) Loose electrical connection.	(1) Check all connections for tightness.
	(2) Control assembly switch not closing.	(2) Check for incorrect installation and/or adjustment of control assembly and control cables.
	(3) Solenoid inoperative.	(3) Check for incorrect connections at solenoid. If connections are correct and solenoid is not operating replace solenoid.
MOTOR OPERATES BUT PLOW WILL NOT RAISE	(1) Low fluid level.	(1) With lift arm fully retracted, fill reservoir to a point one inch below top of filler hole with hydraulic fluid.
	(2) Control valve not opening or opening incompletely.	(2) Check for incorrect installation and/or adjustment of control assembly and control cables.
PLOW DOES NOT LOWER OR LOWERS SLOWLY	(1) Control valve not opening or opening incompletely.	(1) Check for incorrect installation and/or adjustments of control assembly and control cables.
PLOW WILL NOT HOLD IN RAISED POSITION	(1) Control valve not being completely closed.	(1) Check for incorrect installation and/or adjustments of control assembly and control cables.
MOTOR OPERATES BUT PLOW WILL NOT ANGLE IN ONE DIRECTION	(1) One or both hydraulic couplers not completely engaged.	(1) Check couplers for proper engagement.
	(2) Power angling cylinders not charged and bled properly.	(2) Recharge and bleed power angling cylinders.
	(3) Control valve not opening or opening incompletely.	(3) Check for incorrect installation and/or adjustments of control assembly and control cables.
PLOW DOES NOT HOLD IN DESIRED ANGLED POSITION	(1) Control valve not being completely closed.	(1) Check for incorrect installation and/or adjustment of control assembly and control cables.

Disassembly and Inspection

NOTE: *Prior to disassembly, remove filler plug and drain fluid from reservoir (fig. 1-42). Clamp the base in a vise and proceed with disassembly. Subassemblies can be removed without disassembling the unit completely.*

(1) Remove nuts and pull pump and motor assembly away from tank, ram, and pump assembly (fig. 1-43). Discard O-rings.

(2) Loosen bolts at top of motor and separate motor from pump.

NOTE: *Be sure motor end plate is held in place during removal of motor from pump.*

CAUTION: *DO NOT disassemble motor or the pump unit. Proper assembly adjustment cannot be accomplished without special tools and instruments. If these units are defective, they must be replaced as a unit.*

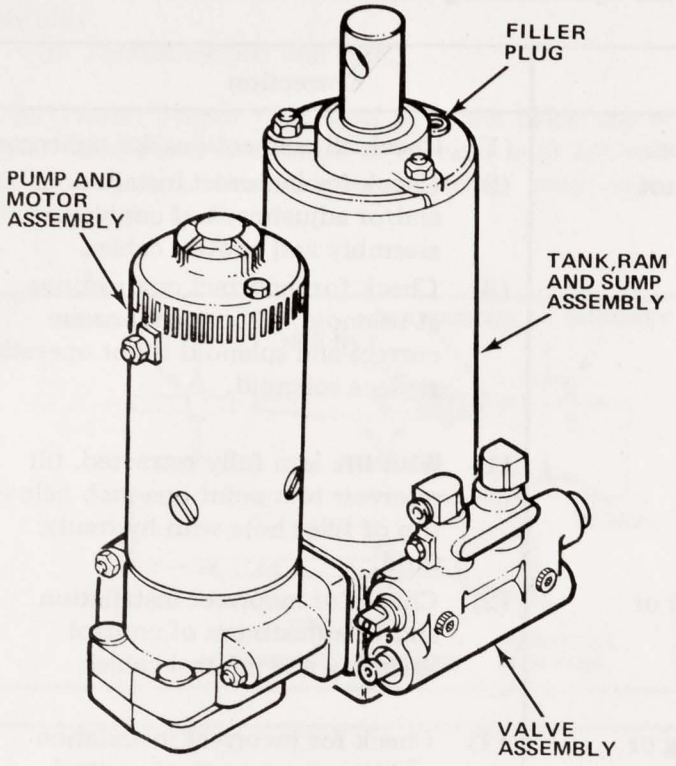


Fig. 1-42 Super Electrolift U-13

(3) Remove capscrews and separate valve assembly from tank, ram, and pump assembly.

(4) Remove locknuts from cover assembly (fig. 1-44).

(5) Inspect cover assembly for cracks or damage to casting.

(6) Inspect wiper seal pressed in cover for cuts and nicks on lip.

NOTE: *The top cover is available only with the wiper seal pressed in place. The seal is available separately and in seal kits.*

(7) Inspect bushing sleeve for excessive wear in displacement-type units. Inspect bushing sleeve, piston, and piston follower for excessive wear in cup-type units.

(8) Inspect cylinder for excessive scoring and pitting in bore and tank cylinder for damaged surfaces.

(9) Inspect ram for nicks and rust. Inspect piston packing cup for excessive wear or cut sealing lip on cup-type units. Replace parts if any of these conditions exist.

(10) Discard O-ring and split-bushing sleeve. Check pump base casting for cracks, damage, or wear.

(11) Remove and inspect check valve seat, ball, spring guide, spring, and retainer for damage.

(12) Remove and discard O-rings in pump base.

(13) Remove snap ring, bushings, and spring (fig. 1-45).

(14) Remove spool, O-ring and backup ring from bore.

(15) Remove end cap and pipe plug.

(16) Remove O-ring, spring, spring guide, ball, O-ring, and valve seat.

(17) Remove end cap and O-ring. Push spool in bore from opposite end until it stops. Hold flat end of spool while removing nut and washer from other end. Remove bushings, spring, and spool from bore.

(18) Remove snap ring and O-ring.

(19) Remove end plug and O-ring. Remove spring, guide, and ball. Repeat procedure for other crossover relief valve.

(20) Remove elbows.

(21) Inspect valve body (single or dual) for cracks, damage, or scored bores. Spools must be free from indentations or deep scratches. Seat should be inspected for imperfections or scratches. Replace if damaged. O-rings and backup rings should be discarded.

Assembly

Before assembly, be sure all components and subassemblies are clean and void of dirt and other foreign material. Use new seals during assembly. Apply a good quality sealing compound (Permatex Form-A-Gasket, No. 1, or equivalent) to all joints that do not have an O-ring (fig. 1-44 and 1-45).

NOTE: *Ball seats must be seated with their respective ball.*

Displacement Type Unit

(1) Assemble O-rings into groove at top of base and into vertical bore in base.

(2) Install studs and tank cylinder to base and cylinder in vertical bore of base.

(3) Insert split-bushing sleeve into groove in ram and insert into cylinder.

(4) Assemble O-ring into groove on outer edge of cover.

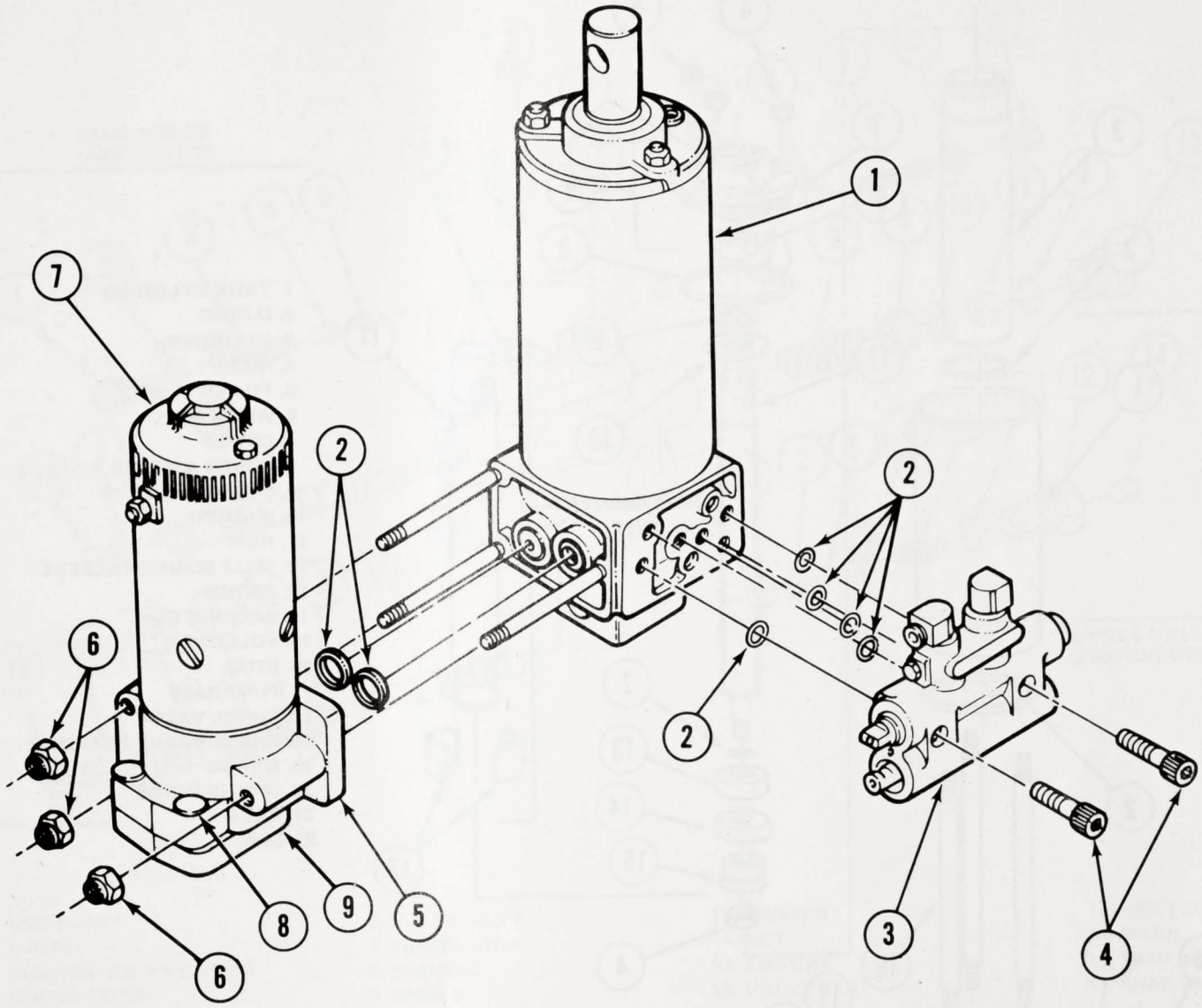
(5) Install bushing sleeve and O-ring into top bore of cover.

(6) Install washer and O-ring into bottom bore of cover.

Cup Type Unit

(1) Assemble O-rings into groove at top of base and vertical bore in base.

(2) Install studs and tank cylinder to base. Assemble O-ring, piston, packing cup and follower into small end of ram. Secure with nut and insert into cylinder.



1. TANK, RAM AND PUMP ASSEMBLY
2. O-RING
3. VALVE ASSEMBLY
4. SOCKET HEAD CAP SCREW
5. PUMP AND MOTOR ASSEMBLY
6. NUT
7. PUMP ASSEMBLY
8. BOLTS
9. MOTOR ASSEMBLY

J50052

Fig. 1-43 Super Electrolift Subassemblies

(3) Start end of ram assembly (with hole) into end of cylinder and install into base.

(4) Assemble O-ring into groove on outer edge of cover.

(5) Install bushing sleeve and O-ring into top bore of cover.

(6) Install washer with slots facing away from wiper seal into top bottom bore of cover.

NOTE: *Coat inside of cover with lithium base grease to keep assembled parts in place. Thread three short studs into base finger-tight.*

Spool Valve Assembly Lift (Single or Dual)

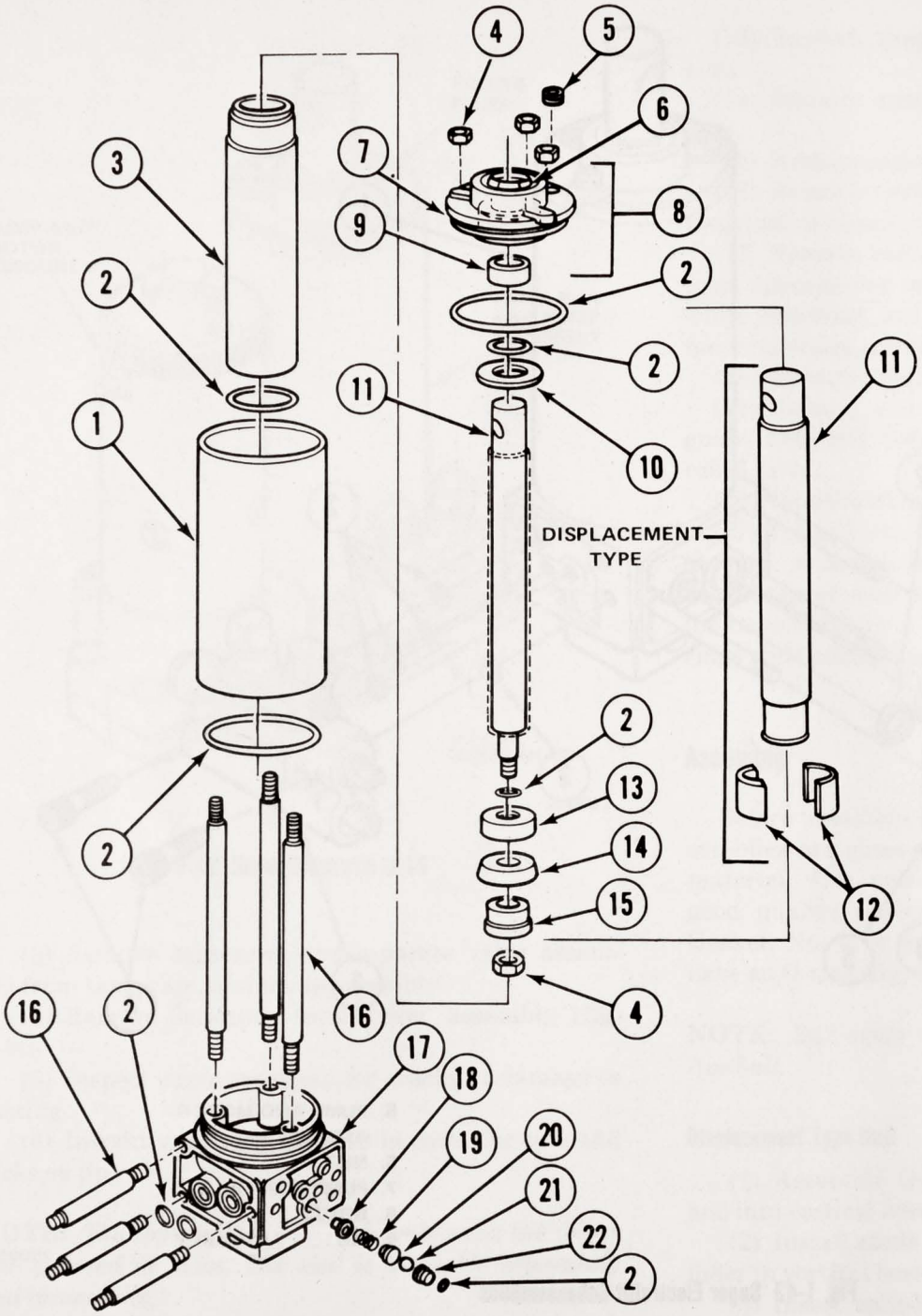
(1) Assemble valve seat, ball, and O-ring into threaded end of bore in valve body (fig. 1-45).

(2) Assemble O-ring into groove on end cap and install spring and spring guide into bore.

NOTE: *Coat parts with a lithium base grease to keep them in place during assembly.*

(3) Install end cap subassembly and tighten. Install pipe plug into end cap.

(4) Assemble O-ring and backup ring into spool. Insert spool assembly into bore.



1. TANK CYLINDER
2. O-RING
3. CYLINDER
4. NUT
5. FILLER PLUG
6. WIPER SEAL
7. COVER
8. COVER ASSEMBLY
9. BUSHING SLEEVE
10. WASHER
11. RAM
12. SPLIT BUSHING SLEEVE
13. PISTON
14. PACKING CUP
15. FOLLOWER
16. STUD
17. PUMP BASE
18. CHECK VALVE
18. CHECK VALVE RETAINER
19. SPRING
20. SPRING GUIDE
21. BALL
22. SEAT

Fig. 1-44 Cover Assembly, Tank, Ram, and Cylinder

(5) Position bushings and spring over spool and install into bore.

(6) Install snap ring (sharp edge facing out) into groove in valve bore. Spool must move freely in bore.

Crossover Relief Valve (Dual Valve)

(1) Install ball, spring guide, and cushion valve spring into valve body (fig. 1-45).

(2) Install O-ring into groove of end cap. Install end cap and O-ring assembly into bore and tighten. Repeat procedure for opposite side.

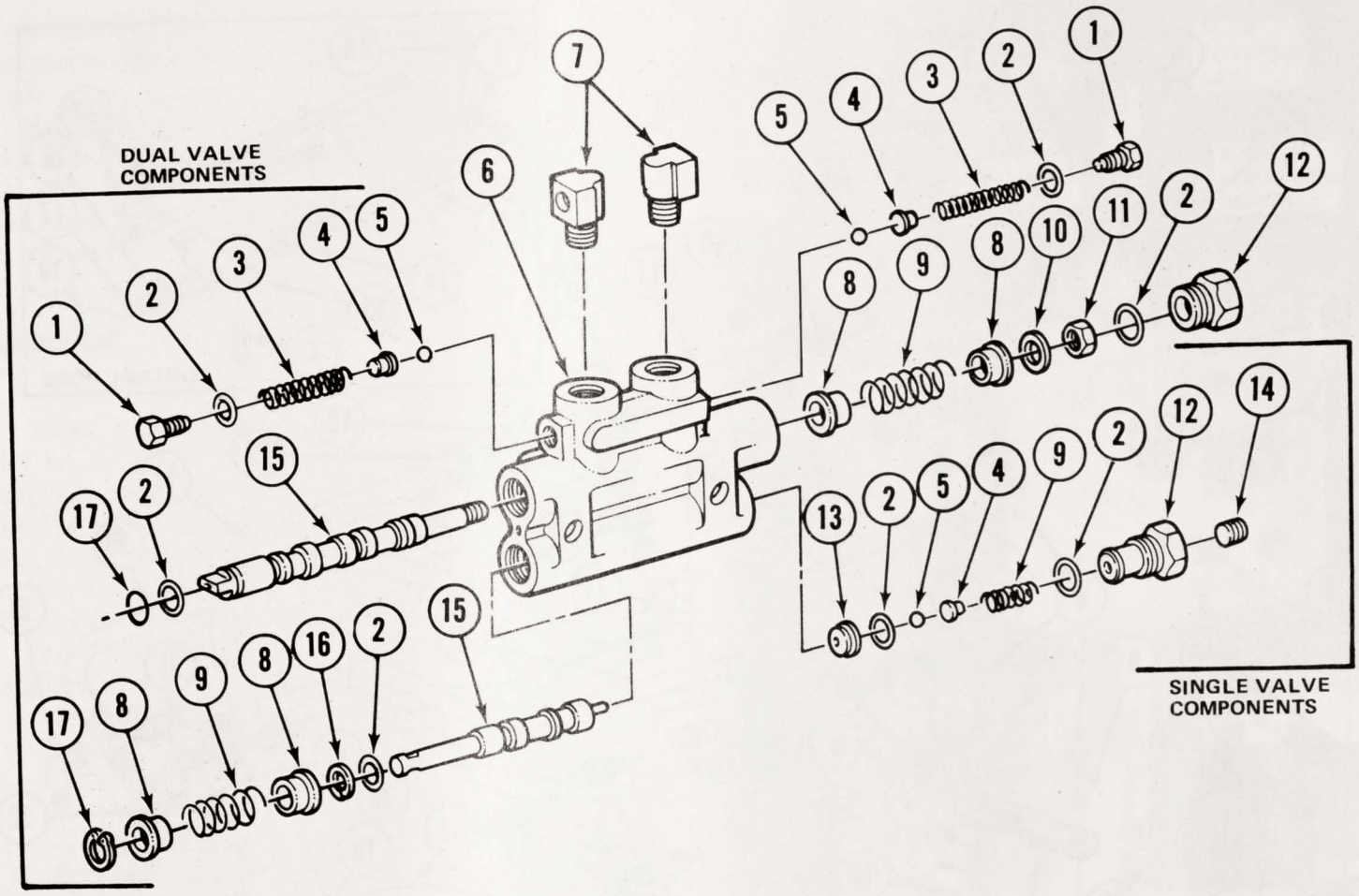
Spool Valve Assembly Power Angling (Dual Valve)

(1) Assemble O-ring and snap ring onto spool and insert spool assembly into bore (fig. 1-45).

(2) Hold flat end of spool and insert bushings, spring, and washer through bore from opposite (threaded) end. Secure with locknut.

(3) Install O-ring into groove of end cap. Install end cap assembly into bore and tighten. Spool must move freely in bore.

(4) Install pipe elbows.



1. END PLUG
2. O-RING
3. CUSHION VALVE SPRING
4. SPRING GUIDE
5. BALL
6. VALVE BODY
7. PIPE ELBOWS
8. BUSHING
9. SPRING
10. WASHER
11. NUT
12. END CAP
13. VALVE SEAT
14. PIPE PLUG
15. SPOOL
16. BACKUP RING
17. SNAP RING

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Fig. 1-45 Spool Valve Assembly

Pump and Motor

(1) Position pump on base with new O-rings and secure with locknuts (fig. 1-44).

NOTE: *Before assembling motor to pump, remove two nuts from long bolts. Be sure the motor end plate is in position after nuts are removed.*

(2) Assemble motor to pump. Tighten bolts from 35 to 50 inch-pounds torque.

Valve Assembly to Base

(1) Assemble check valve retainer, spring, spring guide, ball, seat, and O-ring into base (fig. 1-44).

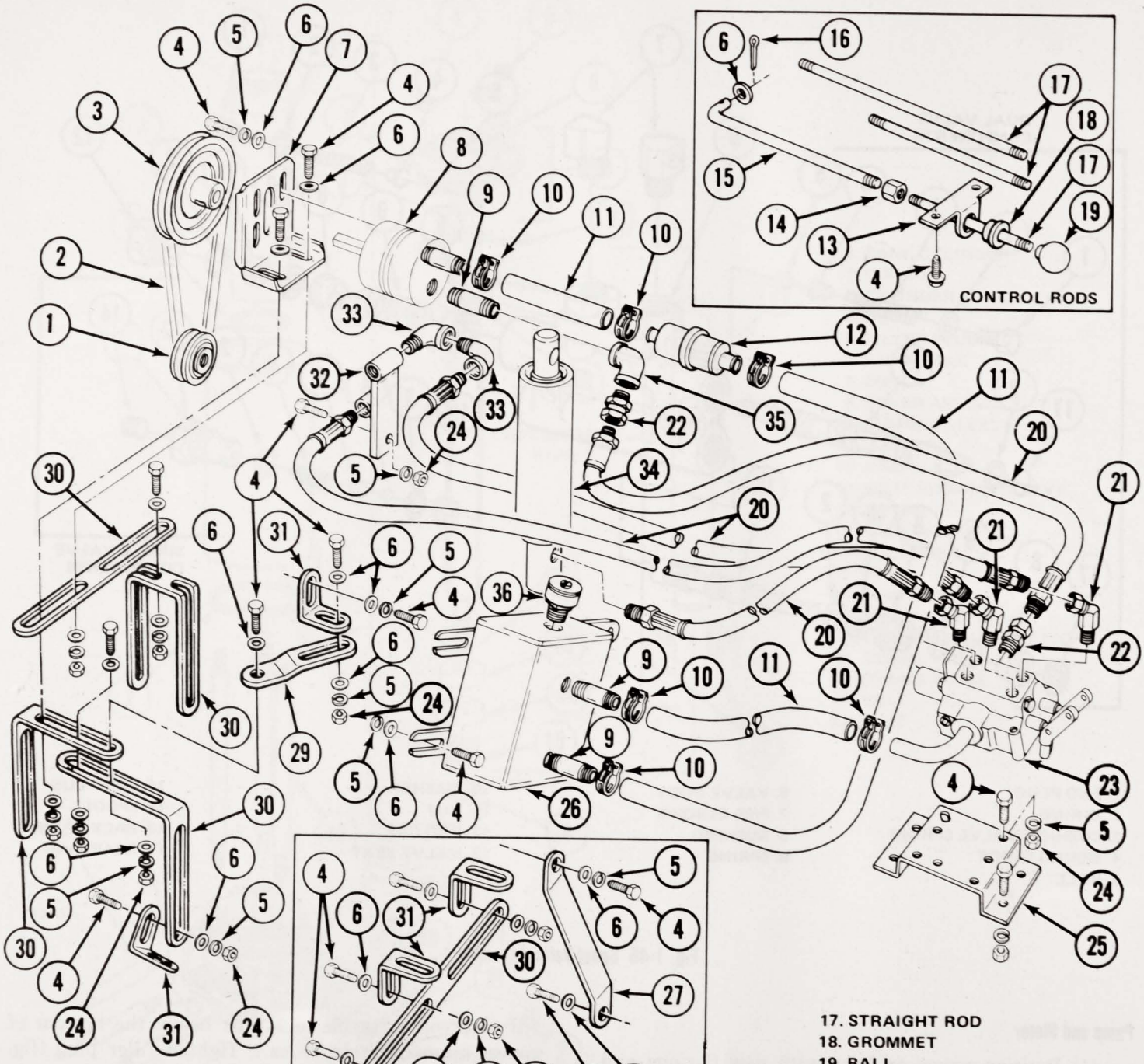
(2) Install O-rings in their respective grooves (fig. 1-43). Install valve assembly with O-ring into base with socket head capscrews. With ram fully lowered, fill reservoir with oil to 1 inch below the bottom of cover (approximately 28 oz.). Tighten filler plug (fig. 1-44).

HY-LO JACK II, B SERIES (3-WAY and 7-WAY) SYSTEM

General

With the exception of the plow lift cylinder and angling rams, most of the hydraulic system components are mounted under the hood, including the hydraulic pump, reservoir, and control valve block assembly.

This unit is controlled by rods operated from the instrument panel which are linked to a 3-way hydraulic control valve block for raising and lowering the plow, or to a combination control valve which adds angling capabilities to the plow.



1. ALTERNATOR PULLEY
2. DRIVE BELT
3. PUMP PULLEY
4. SCREW
5. LOCKWASHER
6. FLAT WASHER
7. PUMP MOUNTING BRACKET
8. PUMP
9. NIPPLE
10. HOSE CLAMP
11. LOW PRESSURE HOSE
12. INLINE FILTER
13. DASH BRACKET
14. ROD CONNECTOR
15. BENT ROD
16. COTTER PIN
17. STRAIGHT ROD
18. GROMMET
19. BALL
20. HIGH PRESSURE HOSE
21. 45 DEGREE ADAPTER COUPLING
22. STRAIGHT ADAPTER COUPLING
23. VALVE ASSEMBLY
24. HEX NUT
25. VALVE MOUNTING BRACKET
26. TANK RESERVOIR
27. REAR BRACE BAR
28. FLAT BRACE BAR (Z-MOUNTING BRACKET)
29. OFFSET BAR
30. FLAT SLOTTED BAR
31. TOP ANGLE BRACKET
32. JUNCTION BLOCK
33. STREET ELL
34. LIFT CYLINDER
35. ELBOW
36. VENT PLUG

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Fig. 1-46 Hy-Lo Jack II

A hydraulic fluid reservoir and fan belt driven pump provide the fluid power source to actuate the plow.

Hydraulic hoses, coupled to the lift ram and junction block, are routed through the vehicle front end sheet metal and are connected to the control valve block assembly. There are no electrical components in this system.

Installation

These instructions cover the installation of the Hy-Lo, B Series, 7-Way System (fig. 1-46), which adds angling capabilities to the snow plow rather than just raising and lowering. The 3-way system is the same as the 7-way system except for incorporating four less valves than in the 7-way system. All control valves are located in the same valve block assembly.

(1) Disconnect and remove battery for access to installation area.

(2) Remove alternator. Place alternator in vise and remove nut and washer from pulley shaft. Leave pulley on shaft.

(3) Attach pulley included in HY-20 Jack II kit to pulley shaft by screwing on to threaded shaft end. Tighten socket head screws to secure new pulley to original alternator pulley.

(4) Install alternator. Do not tighten attaching bolts.

NOTE: *Installation of the Hy-Lo B Series is the same for both six-cylinder and eight-cylinder models with the exception of the pump. The pump support installation is not the same because of the different engine configurations.*

Pump Installation—Eight-Cylinder Models

(1) Attach flat slotted bar to alternator pivot bolt (fig. 1-47).

(2) Remove water pump bolt at point just above heater hose connection on water pump.

(3) Attach offset bar to water pump using bolt removed in previous step. Do not tighten bolt.

(4) Place flat brace bar (fig. 1-46) in vise and bend into Z-mounting bracket (fig. 1-48).

(5) Remove engine bolt (fig. 1-48) and attach Z-mounting bracket to engine block using engine bolt. Do not tighten bolt.

(6) Attach offset bar and Z-mounting bracket to flat slotted bar using screw, flat washers, lockwasher, and nut.

(7) Adjust alternator belt and tighten all bolts used in bracket and bar installations.

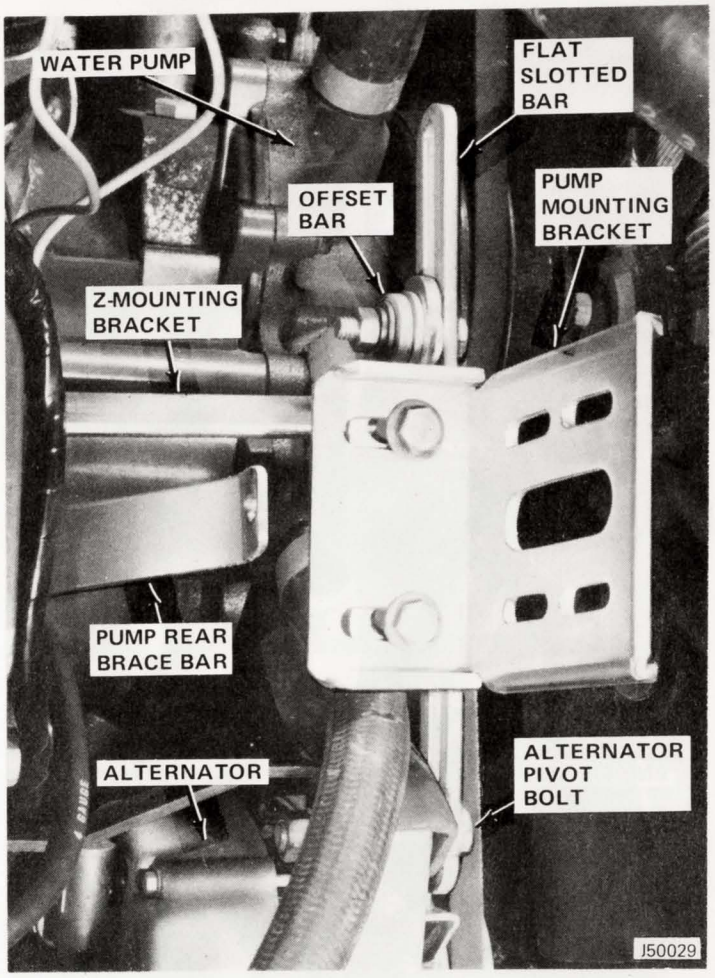


Fig. 1-47 Pump Bracket Installation—Eight-Cylinder

(8) Assemble two top angle brackets to pump mounting bracket with screws, flat washers, lockwashers, and nuts (fig. 1-48).

(9) After attaching top angle brackets to pump mounting bracket, attach top angle brackets to flat slotted bar with capscrews, flat washers, lockwashers, and nuts.

(10) Remove engine ground cable bolt and attach pump rear brace bar and ground cable (with flat washer between ground cable and rear brace bar) to engine. Do not tighten bolt.

(11) Attach pump to pump mounting bracket with screws, lockwashers, and flat washers (fig. 1-49). Do not tighten screws.

(12) Adjust pump rear brace bar as required for proper alignment and attach to pump with screw, lockwasher, and flat washer. Tighten all bolts (except ground cable bolt) and screws on bracket installation.

(13) Install pump pulley on pump shaft, align with drive pulley on alternator using straightedge, and tighten pump pulley setscrews.

(14) Install pump drive belt. Move pump up on pump mounting bracket to tighten belt, and tighten screws holding pump on mounting bracket.

(15) Tighten ground cable mounting bolt.

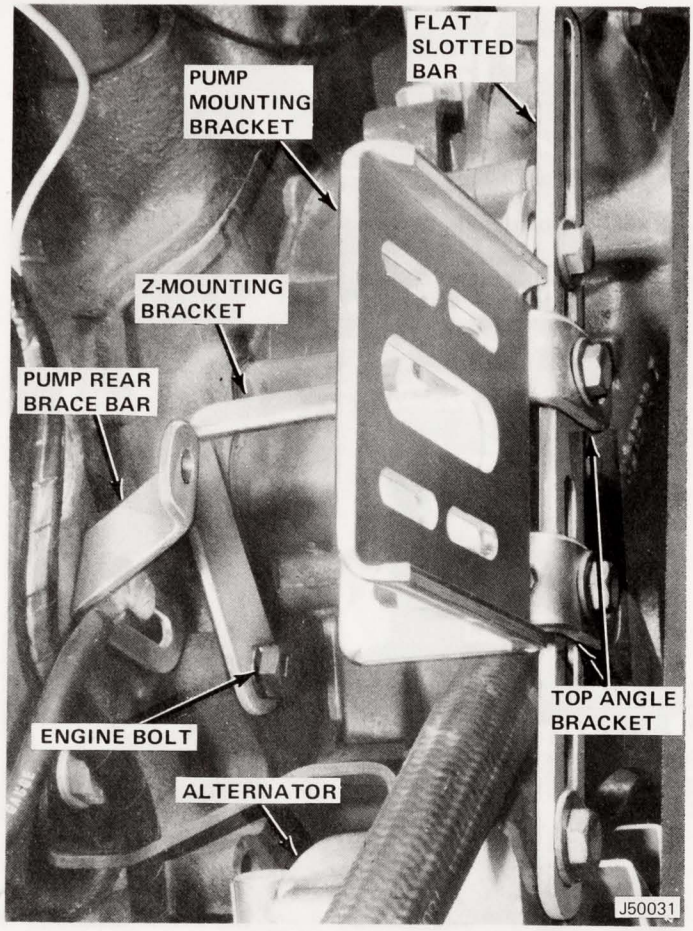


Fig. 1-48 Pump Support Bracket Installation—Eight-Cylinder

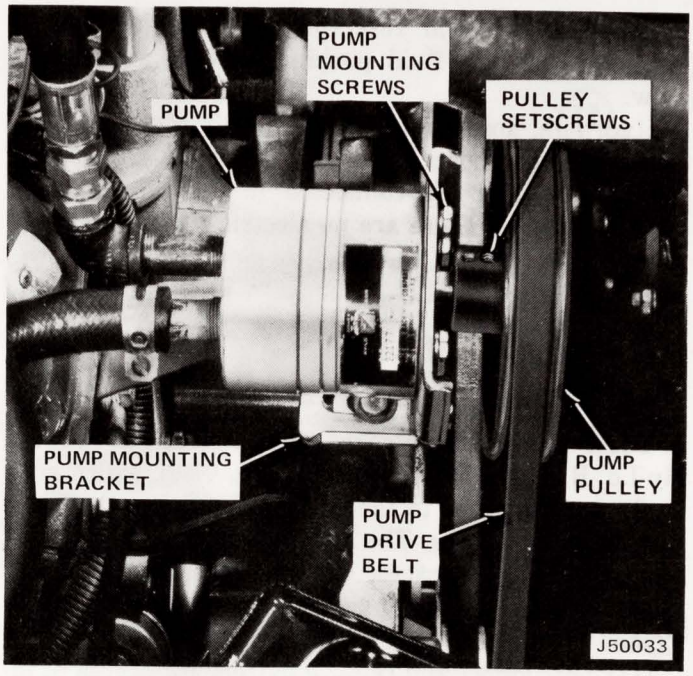


Fig. 1-49 Pump Installation

Pump Installation—Six-Cylinder Model

(1) Four slotted bar pieces are required for six-cylinder model pump installation. One flat piece is required. Using vise, bend two slotted bar pieces into L-shape and one into U-shape (fig. 1-46).

(2) Remove alternator pivot bolt and install U-shape slotted bar piece at alternator pivot point. Replace bolt but do not tighten (fig. 1-50).

(3) Loosely assemble two L-shaped sections and top angle bracket using screws, flat washers, lockwashers, and nuts (fig. 1-46).

(4) Remove alternator belt tension adjustment bolt and engine ground bolt (fig. 1-51).

(5) Position assembled L-shaped sections over alternator belt tension adjustment point and engine ground point. Secure L-shaped section in position using appropriate bolts.

(6) Adjust alternator belt tension and tighten all bolts used in L-shaped and U-shaped slotted bar installations.

(7) Attach flat slotted bar to U-shaped slotted bar using screw, flat washers, lockwasher, and nut. Do not tighten.

(8) Attach pump mounting bracket to flat slotted bar using two screws, four flat washers, two lockwashers, and two nuts. The screw nearest center of engine compartment should go through pump mounting bracket, flat slotted bar, and L-shaped slotted bar section attached to alternator. Tighten all screws.

(9) Loosely assemble short offset bar and top angle bracket (fig. 1-46) on L-shaped slotted bar.

(10) Attach pump to pump mounting bracket (fig. 1-49). Do not tighten screws.

(11) Adjust short offset bar and top angle bracket and attach to pump. Do not tighten screws.

(12) Install pump pulley on pump shaft, align with drive pulley on alternator using straightedge, and tighten pump pulley setscrews.

(13) Install pump drive belt.

(14) Move pump up on pump mounting bracket to tighten drive belt. Tighten all bolts and screws.

Hydraulic System and Controls Installation

(1) Install valve attaching bracket on left side of engine compartment (fig. 1-52).

(2) Mark and drill 21/64-inch holes for valve bracket.

NOTE: *In some installations, it may be necessary to form a support bracket out of slotted bar stock for rear of bracket (fig. 1-52).*

(3) Install valve mounting bracket.

(4) Install valve assembly on bracket (fig. 1-46 and 1-53).

(5) Position reservoir as follows:

(a) Cherokee-Wagoneer-Truck—Position on left side of engine compartment (fig. 1-54).

(b) CJ Models—Position on right side of engine compartment (fig. 1-55).

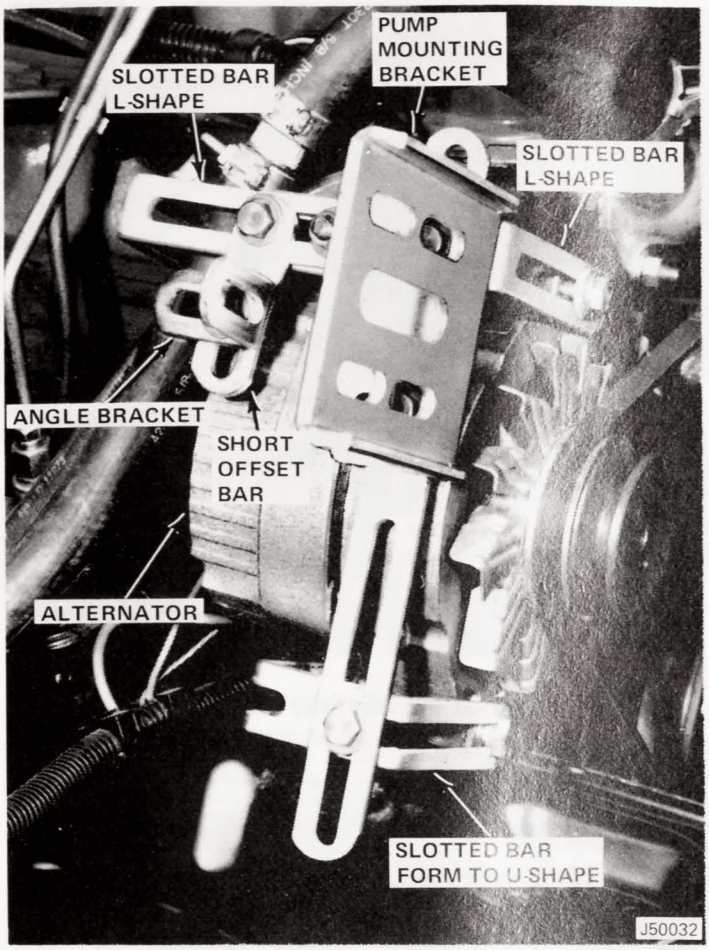


Fig. 1-50 Pump Support Bracket Installation—Six Cylinder

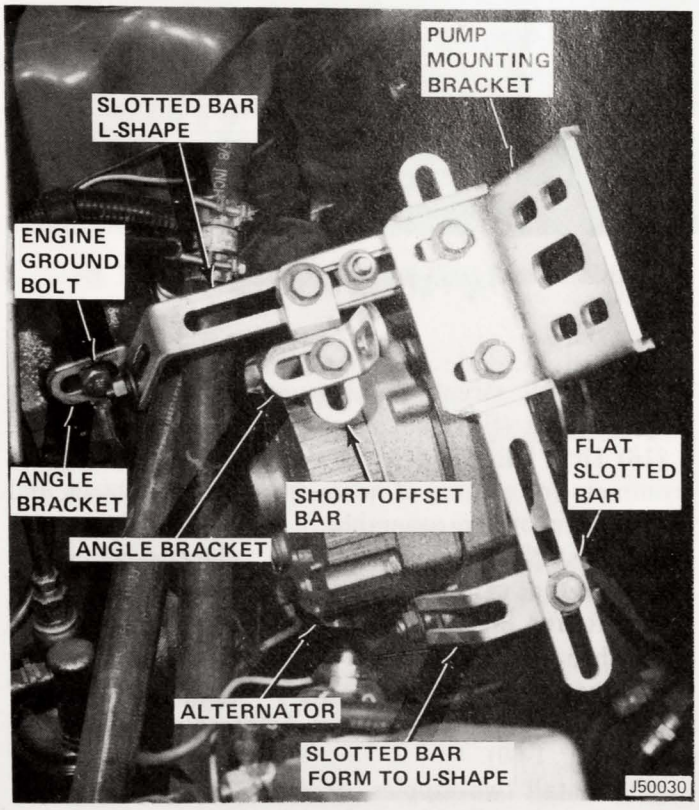


Fig. 1-51 Pump Bracket Installation—Six-Cylinder

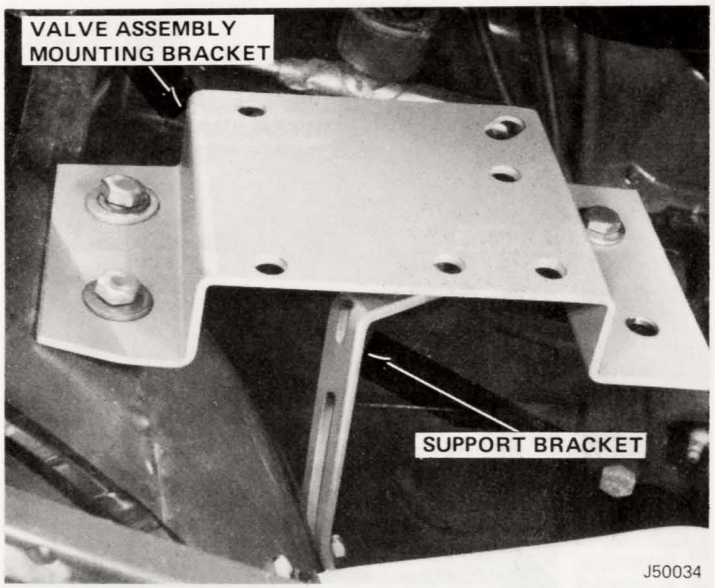


Fig. 1-52 Valve Assembly Bracket Installation

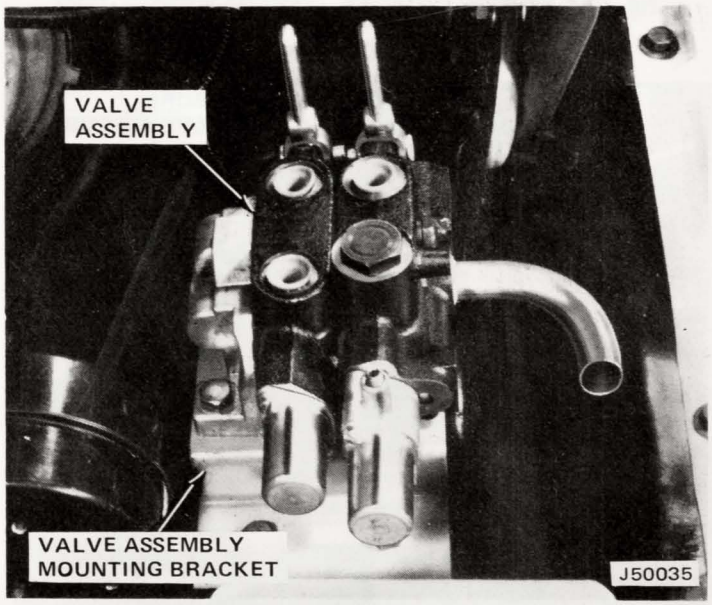


Fig. 1-53 Valve Assembly Mounted

(6) Form bracket as required for installation of reservoir. (Bracket material is supplied with modification kit.)

(7) Drill necessary holes and install reservoir with screws, flat washers, lockwashers, and nuts (fig. 1-54 and 1-55).

(8) Install nipple, elbow, and coupling assembly to hydraulic pump (fig. 1-56).

(9) Install low pressure (return) hose from lower outlet on reservoir to lower connection on hydraulic pump. Secure with hose clamps.

(10) Cut hose and install in-line filter. Secure with hose clamps (fig. 1-56).

(11) Install high-pressure hose assembly from coupling on hydraulic pump to inlet connection on

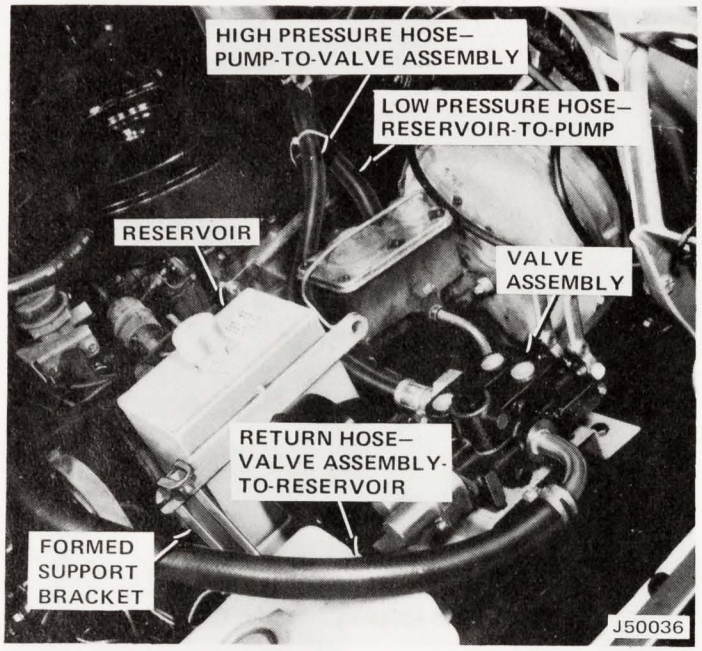


Fig. 1-54 Reservoir Installation—Cherokee-Wagoneer-Truck

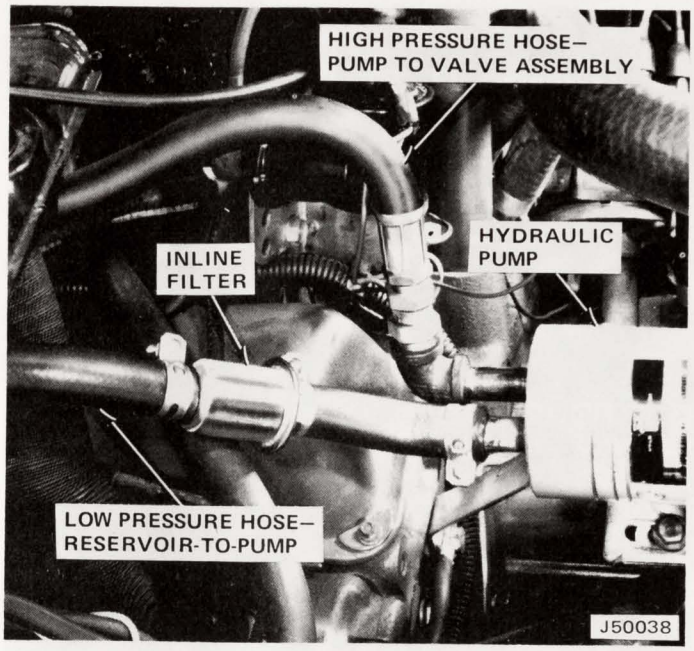


Fig. 1-56 Hydraulic Pump Connections

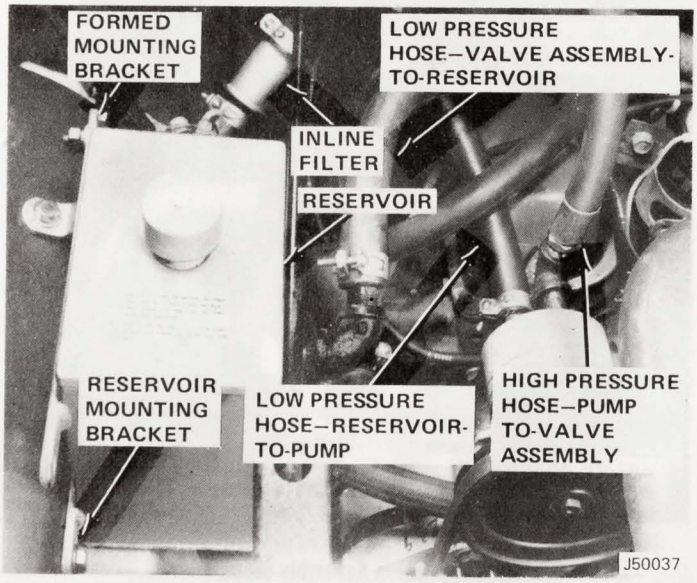


Fig. 1-55 Reservoir Installation—CJ Models

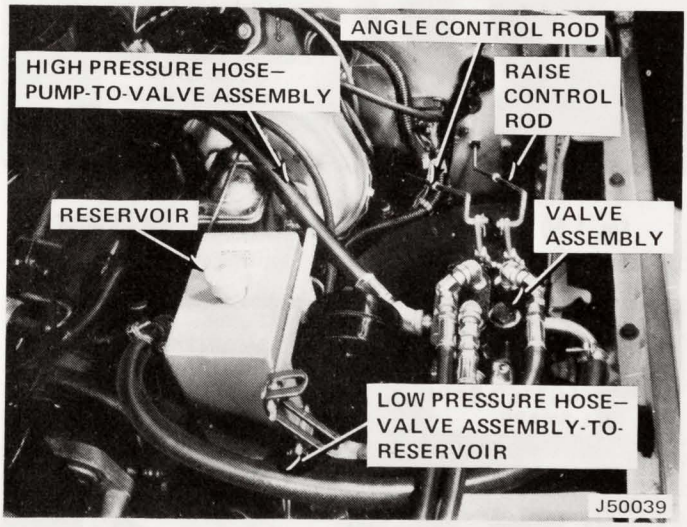


Fig. 1-57 Hose Installation

valve assembly with nipple, 45-degree elbow, and coupling (fig. 1-57).

CAUTION: *When routing hose, be sure it does not interfere with accelerator linkage.*

(12) Install low pressure return hose from valve assembly to inlet on reservoir. Secure with two hose clamps (fig. 1-57).

(13) Install lift cylinder, lift frame, and lift arm, using two bolts and locknut (fig. 1-58).

(14) Position junction block on right side of lift frame angle and drill one 3/8-inch hole. Secure with bolt, lockwasher, and nut.

(15) Install street ells in upper right opening in junction block (fig. 1-58).

(16) Drill holes in front end sheet metal and insert grommets for routing of hoses from junction block and lift cylinder to valve assembly.

(17) Install three elbows, two adapter couplings, and adapter at valve assembly (fig. 1-59).

(18) Route hoses from lift cylinder and junction block through grommets in front end sheet metal to valve assembly and connect.

(19) Install angling rams on A-frame and sector assembly (fig. 1-60).

(20) Install two nipples, one into right angling ram and one into bottom of junction block (fig. 1-60).

(21) Install 90-degree elbows on angling rams.

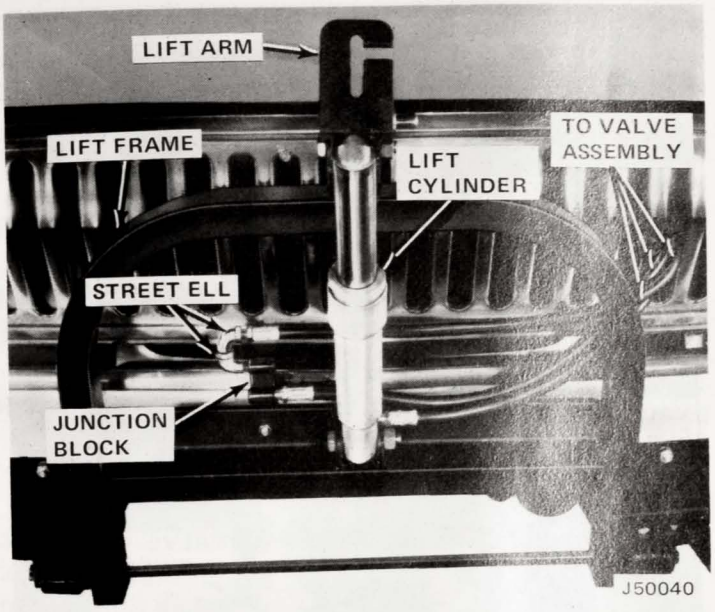


Fig. 1-58 Lift Cylinder and Junction Block Installation

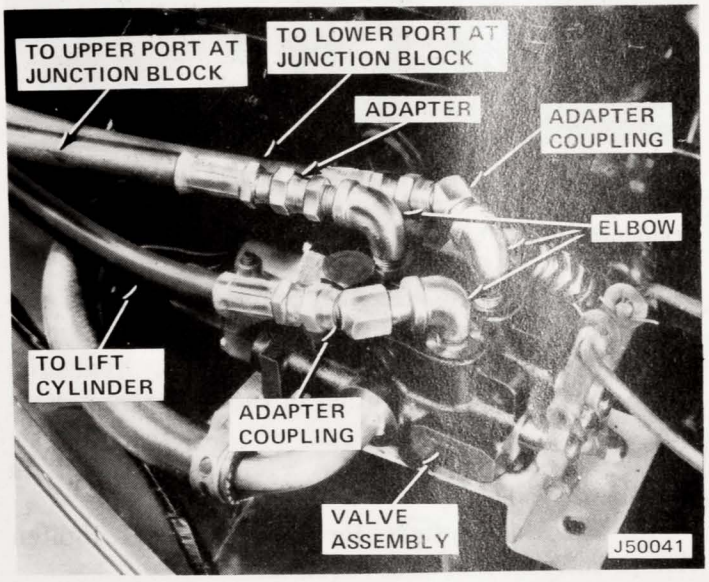


Fig. 1-59 Lift Cylinder and Junction Block Hose Installation

(22) Install couplers, one to nipple on right angling ram and one to nipple on valve block.

(23) Install hydraulic hoses to angling rams and junction block (fig. 1-60).

NOTE: *Control rods may be installed by either of two methods: (1) by drilling holes through instrument panel (fig. 1-61) or (2) under the instrument panel by use of mounting brackets (fig. 1-62).*

(24) **Instrument Panel Installation**—Drill two 9/16-inch holes in firewall and in instrument panel and insert grommets.

(25) **Bracket Installation**—Position brackets and drill holes.

(26) Insert ends of rods through control arms on

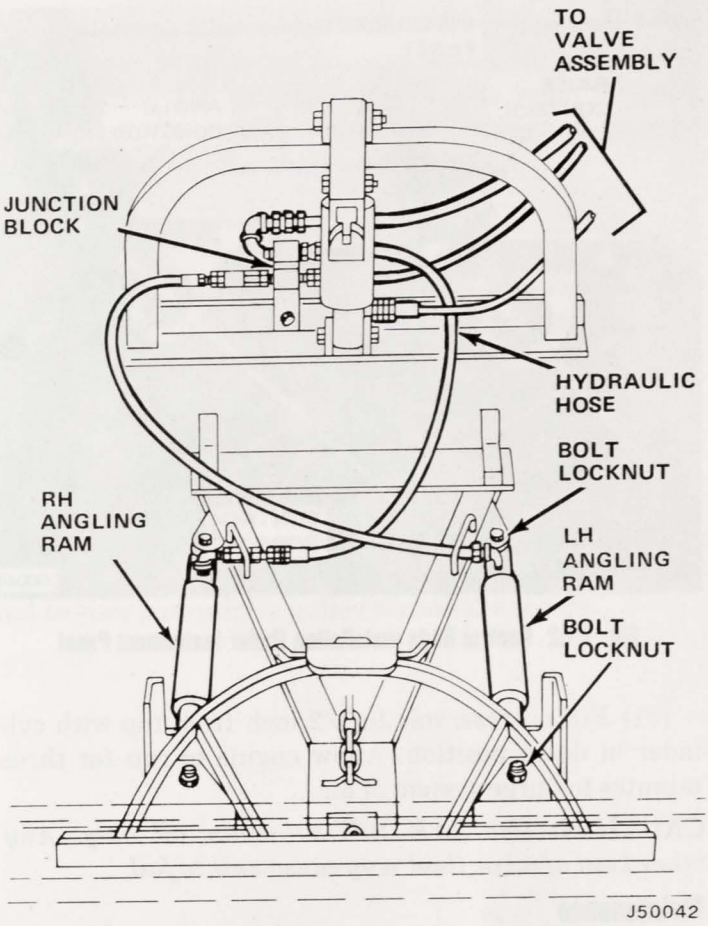


Fig. 1-60 Angling Ram and Hose Installation

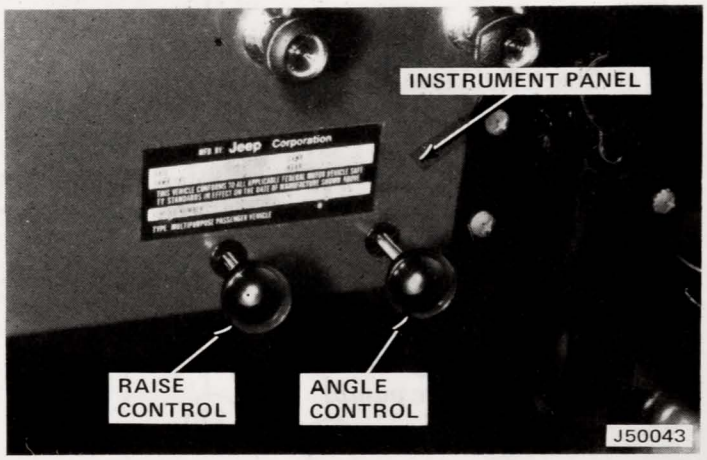


Fig. 1-61 Control Rods Installation Through Instrument Panel

valve assembly and secure with flat washers and cotter pins (fig. 1-63).

(27) Insert center control rod section through grommets in firewall and secure rods with connectors.

(28) Insert control rods through instrument panel or bracket and secure with connectors.

(29) Install knobs.

(30) Install and connect battery.

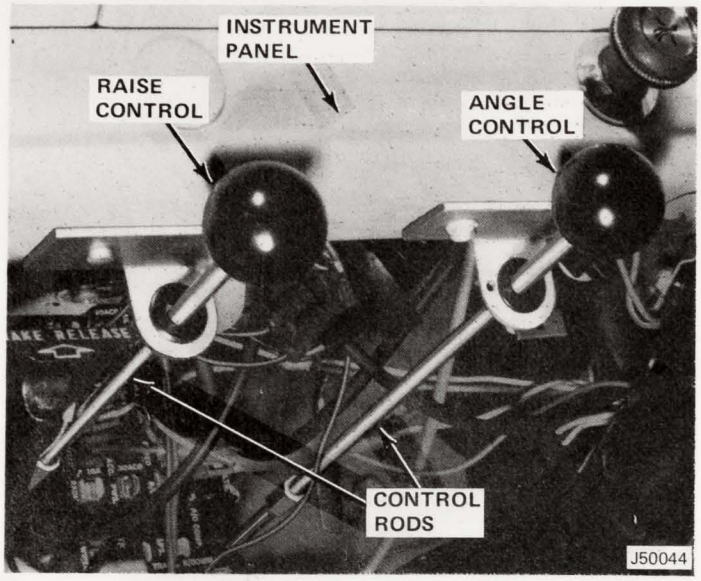


Fig. 1-62 Control Rods Installation Under Instrument Panel

(31) Fill oil reservoir to 1/2 inch from top with cylinder in down position. Allow engine to run for three minutes to purge system of air.

CAUTION: *Use SAE 10W-30 motor oil only. Any other kind of oil or fluid may cause unit to fail.*

Maintenance

(1) After engine has run five hours, in-line filter should be removed and cleaned thoroughly. Replace if necessary.

(2) Flush and clean oil reservoir at least twice a year.

(3) Be sure pump pulley setscrews are tight.

(4) Check fluid level.

Post-Season Maintenance

(1) Fully extend lift arm and coat rod with grease and level in extended position.

(2) Coat exposed portions of power angling cylinder with grease.

NOTE: *Remove drive belt between pump and alternator so as not to damage pump.*

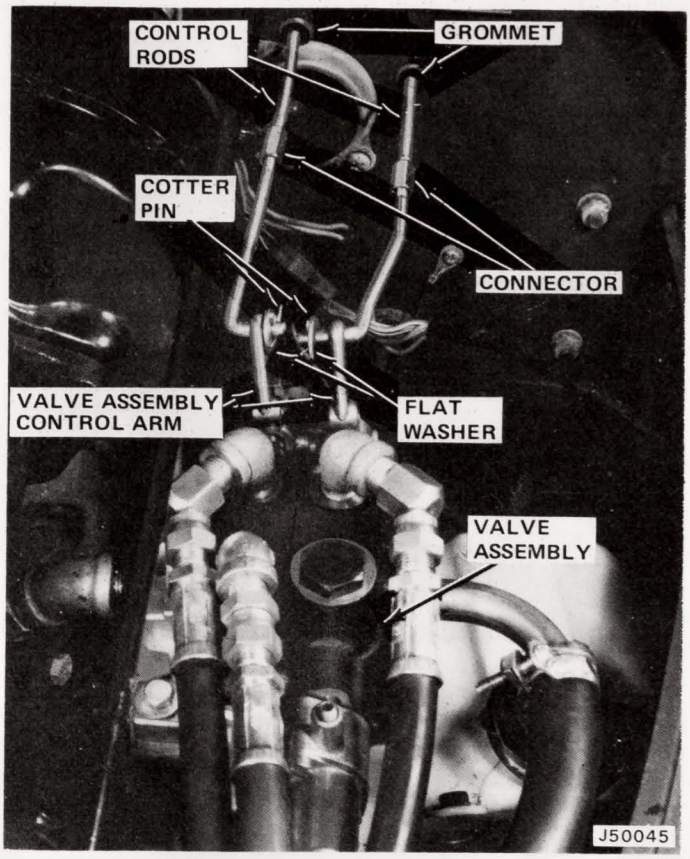


Fig. 1-63 Control Rod Routing Through Firewall

Troubleshooting

Since there are no electrical components in this system, troubleshooting consists of:

(1) Checking hydraulic connections, hydraulic pump function, and operation of control valve assembly.

(2) Checking oil reservoir. Fluid level should be 1/2 inch from top.

(3) Checking system for oil leaks and tighten clamps and connections as required.

(4) Being sure setscrews on pump pulley are tight and that drive belt is not slipping.

NOTE: *If system does not operate properly after performing basic checks and adjustments, refer to Service Instructions.*

SERVICE INSTRUCTIONS

HYDRAULIC PUMP

Disassembly and Inspection

Before removing hydraulic pump assembly or control valve assembly, be sure that all maintenance and troubleshooting procedures have been performed. If repairs are to be made, it is recommended that the proper kit or kits be purchased prior to disassembly. These kits contain proper seals and gaskets or gear sets to repair the unit.

NOTE: *When removing the units from vehicle, be sure disconnected hose ends are secured above the level of the reservoir to prevent loss of oil from the system.*

(1) Remove capscrews and suction plate (fig. 1-64). Discard O-ring. Inspect plate for cracks or damage.

(2) Remove bearings and cylinder plate. Discard O-ring. Inspect bearings and cylinder plate for damage.

(3) Remove keeper rings, keys, and gears. Inspect gears for excessive wear.

(4) Remove wear plate, discard O-ring, and inspect wear plate for damage.

(5) Remove drift shaft, idler shaft, alignment pins, and bearings from pump base. Inspect drive shaft and idler shaft for scratches or excessive wear. Inspect bearings for damage.

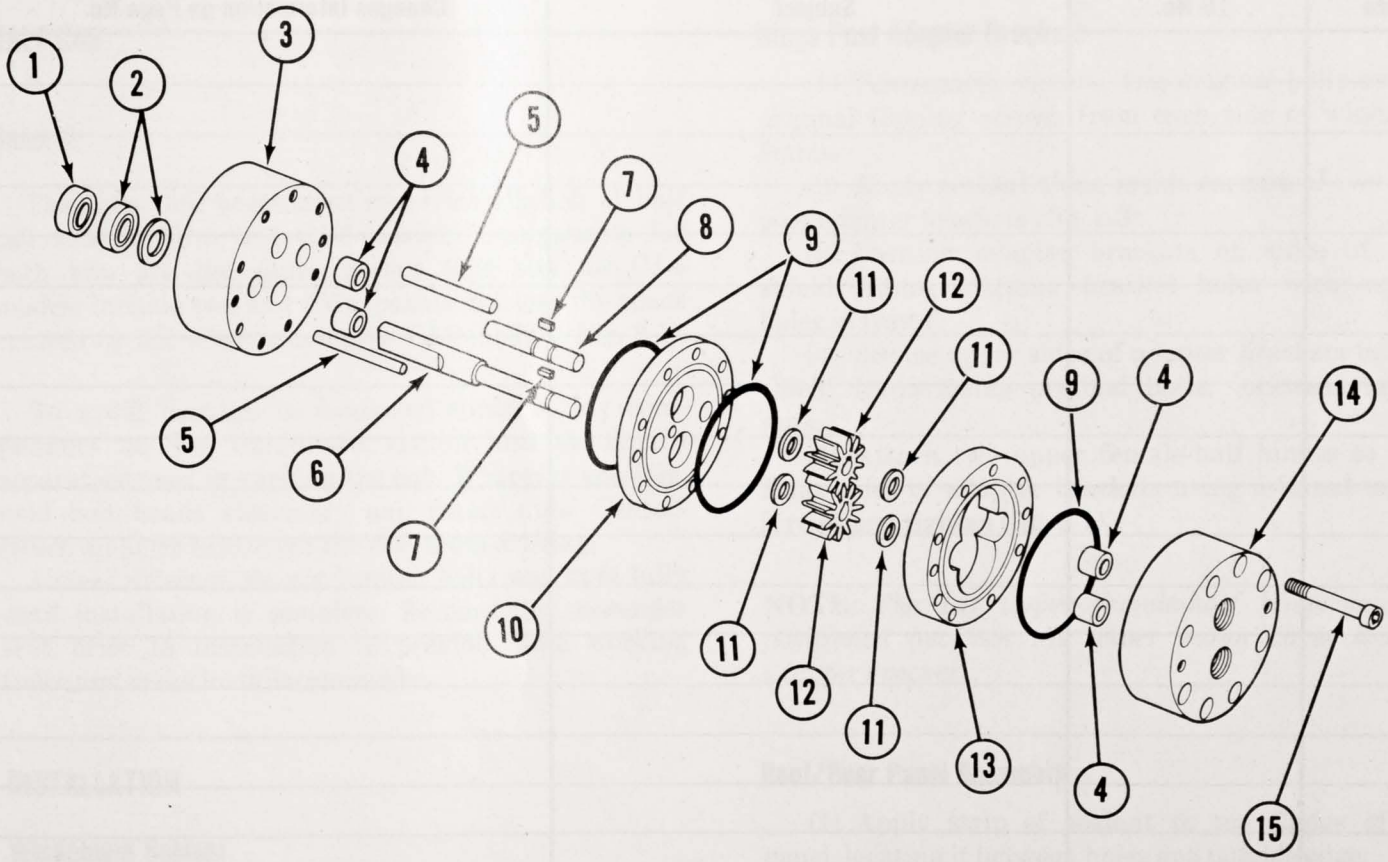
(6) Remove pump base ball bearing and seal with gasket from pump base. Discard seal with gasket. Inspect bearing for damage or excessive wear. Inspect pump base for cracks, excessive wear, and out-of-round in drive or idler shaft holes.

Assembly

Before assembly, be sure that all components are clean and free of dirt and other foreign materials. Use new seals and gaskets when assembling unit.

HY-LO JACK II REPLACEMENT

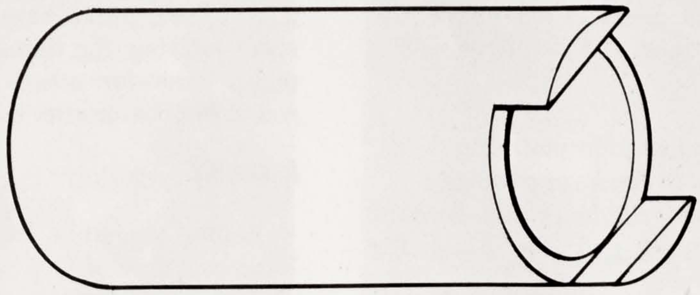
When installing unit in vehicle, refer to installation instructions. Replace in-line filter and check oil level in reservoir. Check pump drive belt for excessive wear, and be sure pump drive pulley screws are secure.



1. PUMP BASE BALL BEARING
2. SEAL W/GASKET
3. PUMP BASE
4. BEARINGS
5. ALIGNMENT PIN
6. DRIVE SHAFT
7. KEY
8. IDLER SHAFT
9. O-RING
10. WEAR PLATE
11. KEEPER RING
12. GEAR
13. CYLINDER PLATE
14. SUCTION PLATE
15. SOCKET HEAD CAPSCREW

J50055

Fig. 1-64 Hydraulic Pump Hy-Lo Jack II



J-25399
SOLENOID SOCKET WRENCH J50199

Special Tools

TECHNICAL BULLETIN REFERENCE

Date	TB No.	Subject	Changes Information on Page No.

CABS—CAP

CABS

HALF CAB

General

The following procedures cover installation of half cab kits on CJ-5 and CJ-6 models. Components for both kits are the same, except that kits for CJ-6 models include two end filler panels to close the space created by the wheelhousing on CJ-5 models (Fig. 2-1).

To avoid damage to enameled surfaces, lay components on the cardboard carton and cardboard separators used in packing the cab. Wherever possible, hold bolt heads stationary and rotate nuts. Center-punch all holes to prevent the drill from drifting.

Unless directed, do not tighten bolts and nuts fully until installation is complete. Remove the passenger seat prior to installation to provide more working space and make installation easier.

INSTALLATION

Windshield Sealant

(1) Unlatch windshield and pivot forward to rest on hood.

(2) Apply strip sealant across top edge of cowl, positioning it along front edges of air duct openings (fig. 2-2). Apply sealant around edges of both openings.

(3) Return windshield to upright position, but do not latch.

(4) Loosen but do not remove screws attaching windshield hinges to body.

Hinge Post Adapter Brackets

(1) Temporarily remove two original bolts and two original tapping screws from each side of windshield frame.

(2) Apply sealant along inside corners of two hinge post adapter brackets (fig. 2-3).

(3) Position adapter brackets on sides of windshield frame, aligning bracket holes with existing holes in frame.

(4) Secure upper sides of adapter brackets to windshield frame using original bolts, lockwashers, and nuts.

(5) Attach two upper female-half hinges to lower front sides of adapter brackets using original tapping screws and tighten (fig. 2-1).

NOTE: *The LH upper female-half hinge must be positioned between the wiper motor cover and the adapter bracket.*

Roof/Rear Panel Assembly

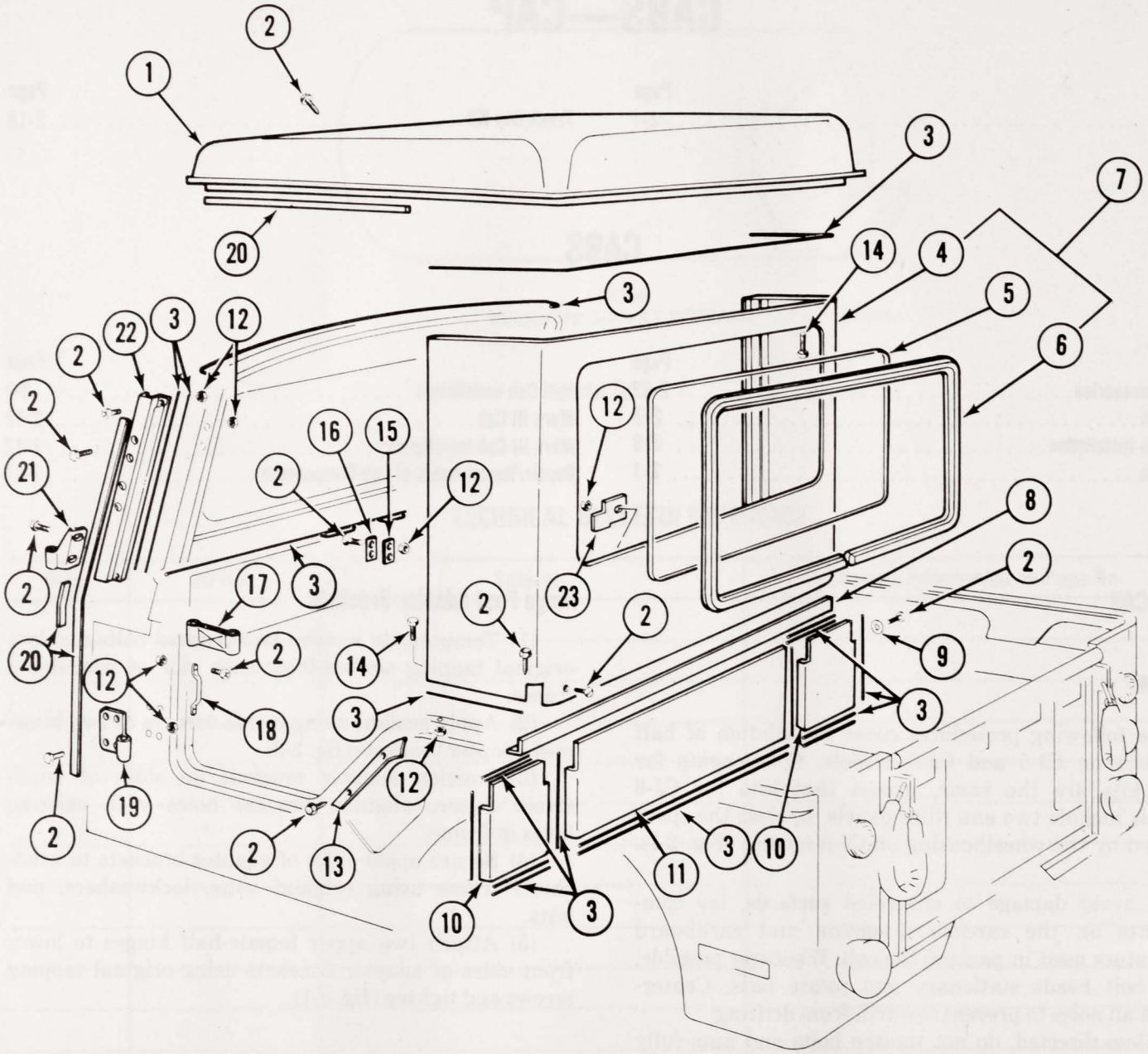
(1) Apply strip of sealant to top flange of rear panel, locating it between holes and outside edge.

(2) Place roof upside down in original carton for protection. Position rear panel on roof. Be careful not to disturb sealant.

(3) Fasten roof and rear panel with bolts and locknuts.

(4) Apply strip of sealant to outside face of windshield frame above roof channel and extend it around top sides of hinge post adapter brackets.

(5) Position roof/rear panel assembly on vehicle with the aid of a helper and pull front of roof down tight on windshield frame.



1. ROOF
2. SCREW
3. SEALANT
4. REAR PANEL
5. GLASS
6. GASKET
7. REAR PANEL ASSEMBLY
8. ANGLE
9. WASHER
10. END FILLER PANEL (CJ-6)
11. FILLER PANEL
12. LOCKNUT
13. FILLER STRIP
14. BOLT
15. SPACER
16. STRIKER
17. STRAP
18. FOOTMAN LOOP
19. LOWER HINGE
20. RUBBER MOULDING
21. UPPER HINGE
22. ADAPTER BRACKET
23. FILLER PLATE

J50069

Fig. 2-1 Half Cab Kit Components

(6) Drill a 13/64-inch hole at each corner, using holes in front of roof as guide, and install Phillips washer-head, self-tapping screws to hold front of roof in position (fig. 2-4).

(7) Adjust roof/rear panel assembly position so inside of rear panel is located 42-1/8 inches from front edge of door opening on each side (fig. 2-5).

(8) Temporarily position door assemblies, with aid of a helper, while adjusting roof/rear panel assembly to obtain proper door fit. Place doors as far forward and upward as possible. Use C-clamps when proper fit is obtained to temporarily secure rear panel mounting flanges to vehicle body.

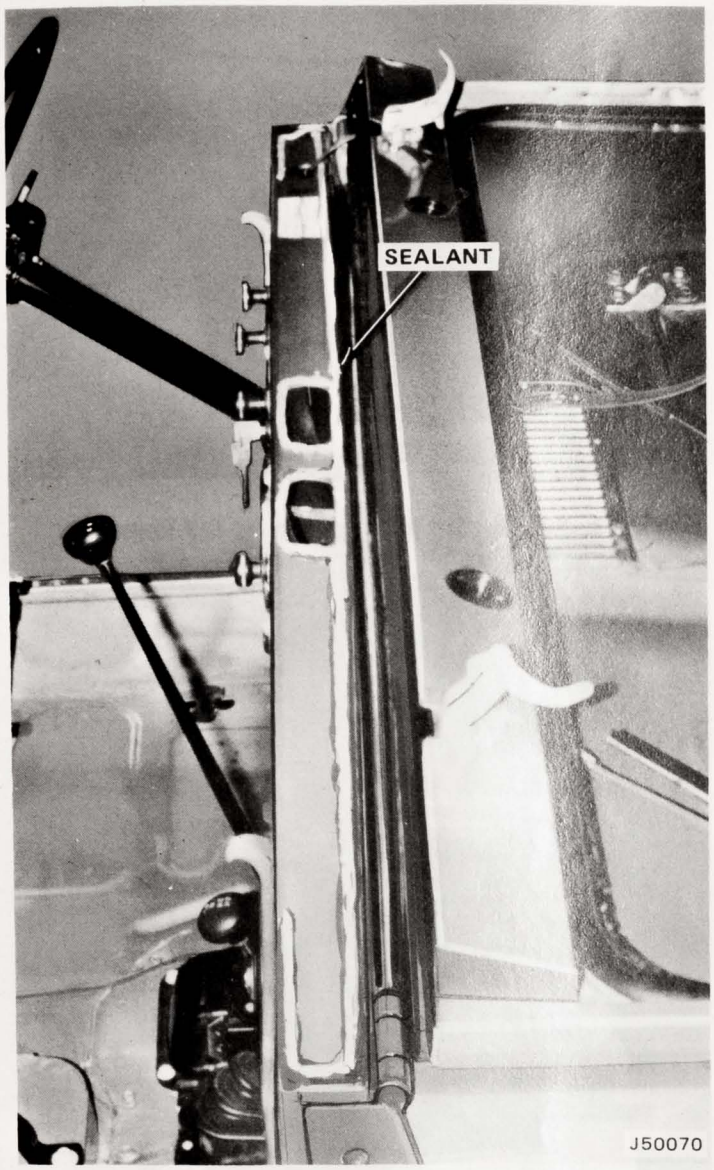


Fig. 2-2 Windshield Sealant Applied to Cowl Top

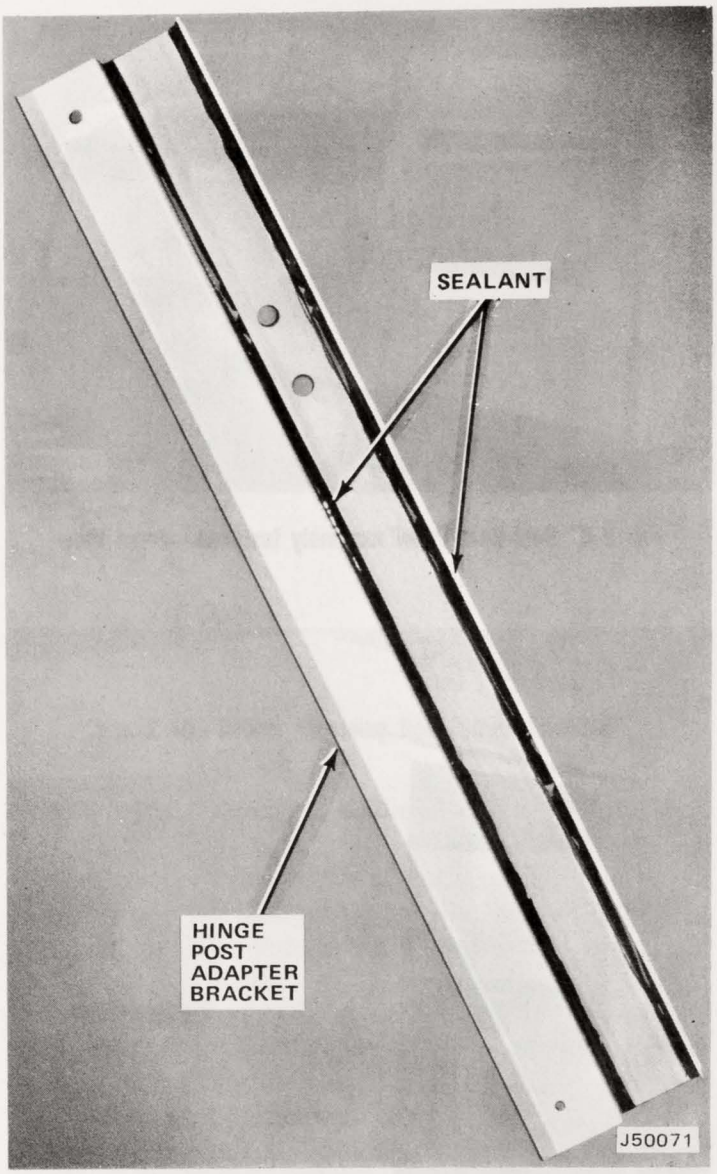


Fig. 2-3 Sealant Applied to Adapter Brackets

(9) Drill remaining 13/64-inch holes in front of roof and install Phillips washer-head, self-tapping screws.

NOTE: *Remove all drill filings to avoid damage to windshield.*

(10) Drill a 13/64-inch hole through each door opening flange using hole in top of each hinge post as a guide. Fasten with truss-head screws and locknuts.

(11) Check door fit again. If correct, latch windshield and adjust latches, if necessary, to allow complete engagement. Tighten hinge attaching screws.

(12) Drill 9/32-inch holes through body using holes in rear panel mounting flanges as templates.

(13) Remove C-clamps and secure rear panel to body with bolts and locknuts.

Doors and Hinges

(1) Position each door in place, with aid of helper, and insert upper male-half hinges in upper female-half hinges. Centerpunch locations for holes to be drilled in door using upper male-half hinges as templates (fig. 2-6).

(2) Drill 9/32-inch hole through each door at hole locations. Fasten upper male-half hinge on door with bolts and locknuts.

(3) Check door alignment and remaining hole locations for proper placement.

(4) Drill remaining holes through door and complete fastening hinge to door with bolts and locknuts.

(5) Install lower female-half hinges onto lower male-half hinges attached to each door. Use lower female-half hinges as template and mark hole locations on body with center punch.

Fig. 2-4 Roof-Rear Panel Assembly Installed—Front View

Fig. 2-6 Marking Hole Locations for Half-Hinges

Fig. 2-5 Roof-Rear Panel Assembly Installed—Rear View

Fig. 2-7 Door and Hinges Installed

(6) Drill 9/32-inch hole through vehicle body on each side and fasten lower female half hinges with bolts and locknuts.

(7) Check door alignment and remaining hole locations for proper placement.

(8) Drill remaining holes through body and complete fastening hinges to body with bolts and locknuts (fig. 2-7).

(9) Install doors.

Door Striker Plates

(1) Attach striker to cab rear panel with flat-head screws and locknuts (fig. 2-8).

(2) Use spacers, if necessary, to obtain proper engagement with door latch.

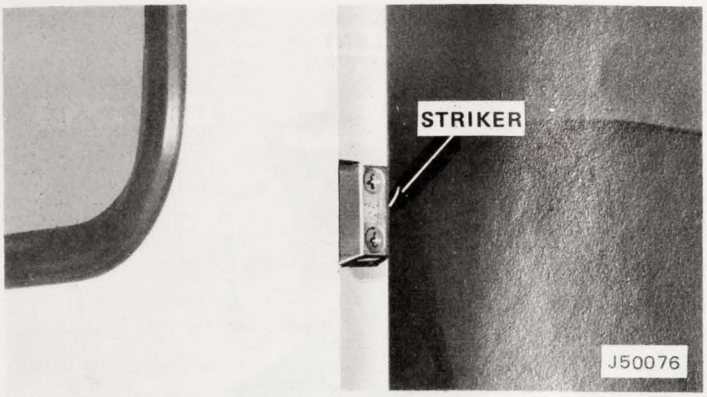


Fig. 2-8 Door Striker Installed

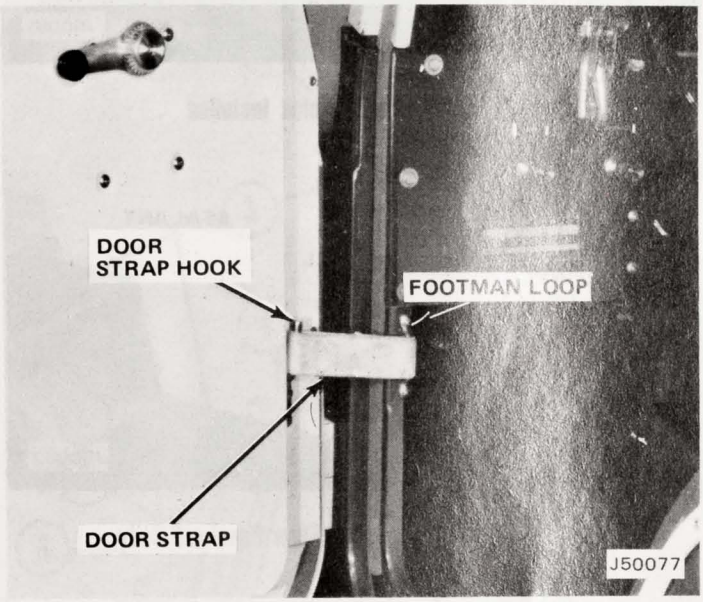


Fig. 2-9 Door Strap and Footman Loop Installed

Door Straps and Footman Loops

(1) Slip one end of door strap onto each door strap hook (fig. 2-9). Insert footman loop into opposite end of each door strap. Position each footman loop on its respective body flange. Locate door strap so it is horizontal.

(2) Use footman loops as templates and mark hole locations on each body flange with a center punch. Drill 7/32-inch holes through each flange at locations marked.

(3) Attach each footman loop to its respective body flange with oval-head screws and locknuts. Check for proper alignment and tighten.

Rubber Moulding Door Straps

A roll of pressure-sensitive rubber moulding is used for making door openings watertight. Proper application of the moulding is important.

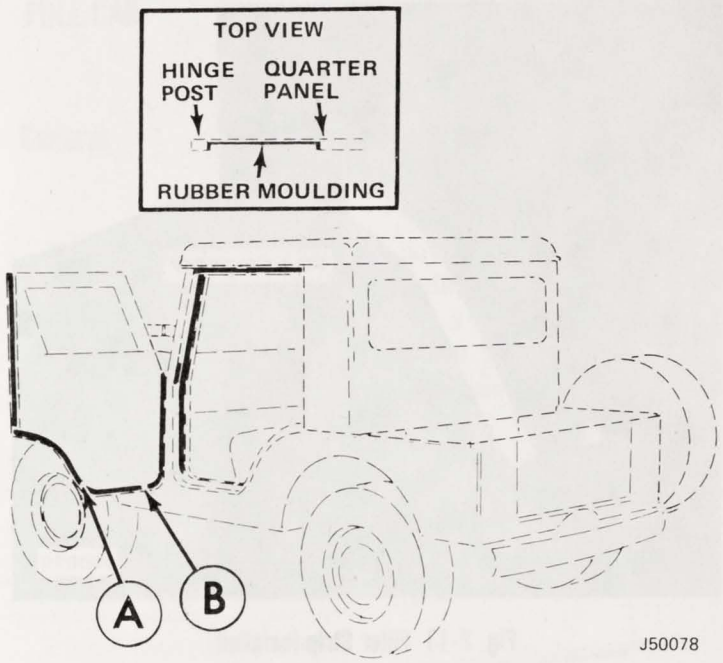


Fig. 2-10 Rubber Moulding Door Strips Installed

NOTE: *Do not stretch moulding when applying.*

(1) Apply vertical strip of rubber moulding along edge of door (striker side), parallel to and 1/8 inch from outside edge and extend from top of door to bottom corner (fig. 2-10).

(2) Butt second strip against lower end of vertical strip, parallel to and 1/8 inch from outside edge, and extend down along bottom of door and up hinge side. Trim surplus material and cut two vertical 1/4-inch wide drain channels at A and B locations.

(3) Apply horizontal strip along top of door opening, beginning on back side of hinge post adapter bracket and extend around corner onto front edge of rear panel.

(4) Apply vertical strip along front edge of door opening, butt top of strip against bottom of horizontal strip, and extend around corner to bottom of hinge post adapter bracket.

(5) Apply vertical strip from bottom of hinge post adapter bracket and extend it down to beginning of radius at bottom corner of door opening.

(6) Apply 8-inch strip at a right angle to vertical strips, with top end at bottom of hinge post adapter bracket.

(7) Check operation of doors and adjust striker plates if necessary.

Filler Strip

(1) Position filler strip on LH body panel (fig. 2-11). Use filler strip as template and mark two hole locations.

(2) Drill 13/64-inch holes through body and attach filler strip with self-tapping screws.

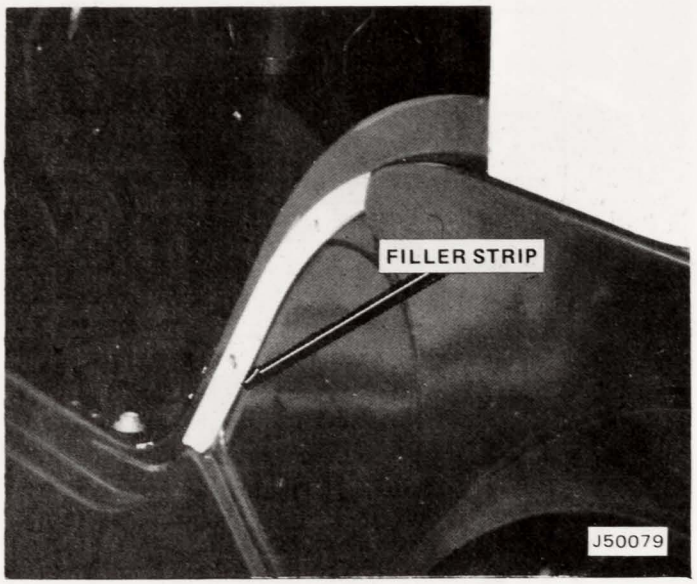


Fig. 2-11 Filler Strip Installed

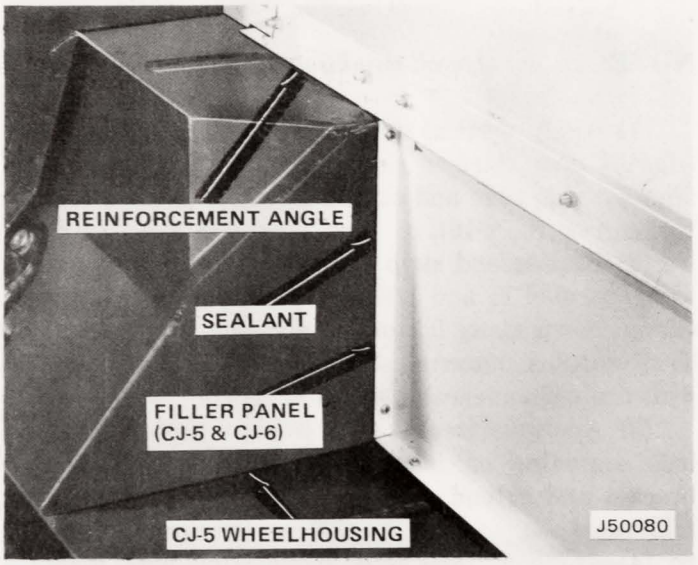


Fig. 2-12 Filler Panel and Reinforcement Angle Installed

Filler Panel and Reinforcement Angle

(1) Temporarily position filler panel and reinforcement angle (fig. 2-12). Use panel and angle as templates and centerpunch hole locations on top and sides of wheelhousings and on floor.

NOTE: *On CJ-6 models, install end filler panels alongside middle filler panel (fig. 2-1). The end filler panels used on CJ-6 models close up space taken up by wheelhousing on CJ-5 models.*

(2) Remove reinforcement angle and filler panel. Drill 5/32-inch holes in locations previously marked.

(3) Apply strip of sealant on top of each wheelhousing, locating it between drilled holes and rear panel. Apply second strip directly on top of first strip.

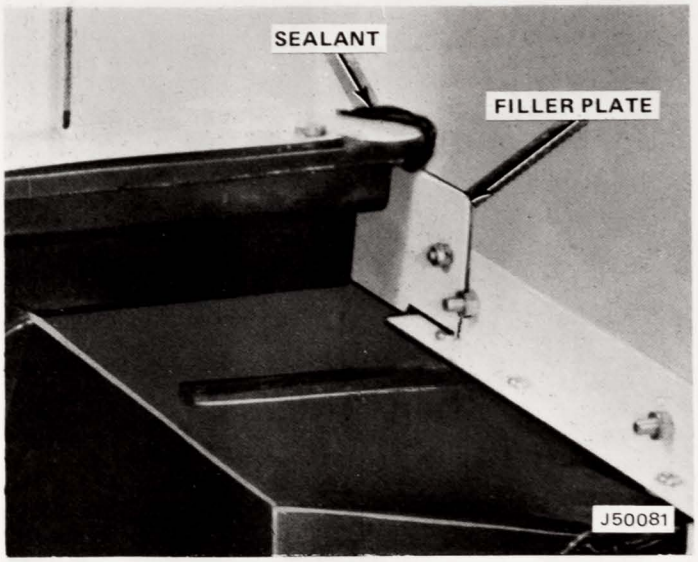


Fig. 2-13 Filler Plates Installed

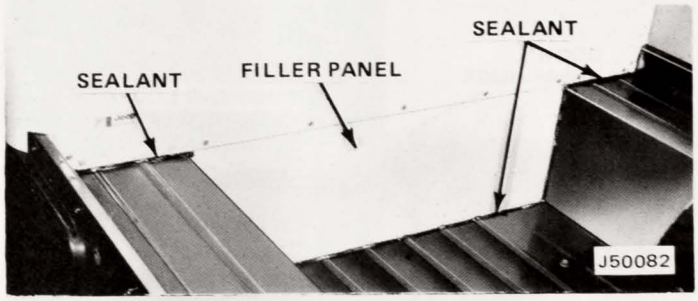


Fig. 2-14 Sealant Applied to Filler Panel and Body

(4) Apply single strip of sealant on sides of wheelhousings and across floor, positioning it just behind drilled holes.

(5) Install filler panel. Be careful not to disturb sealant and attach to panel to wheelhousings and floor with pan-head, self-tapping screws.

(6) Install reinforcement angle and attach to wheelhousings with pan-head, self-tapping screws.

(7) Use holes in lower edge of rear panel as guides and drill 9/32-inch holes through filler panel and reinforcement angle. Fasten with bolts and locknuts.

Filler Plates

(1) Slide filler plate into position at each lower corner of rear panel (fig. 2-13). Some installations may require grinding filler plates to fit.

(2) Use slotted hole in each filler plate as guide and drill 13/64-inch hole through reinforcement angle and rear panel. Fasten with truss-head screws and locknuts.

(3) Force strip sealant between mating edges of filler plates and body and between filler plates and rear panel (fig. 2-14).

Cleanup

(1) Check all joints and seams for complete sealing; use additional strip sealant where necessary. Remove excess sealant with kerosene or suitable solvent.

(2) Be sure that all bolts and nuts are tightened.

(3) Touch up surface scratches or blemishes using No. 432 Champagne White (Ditzler No. 8818 or Dupont No. 7314) or equivalent.

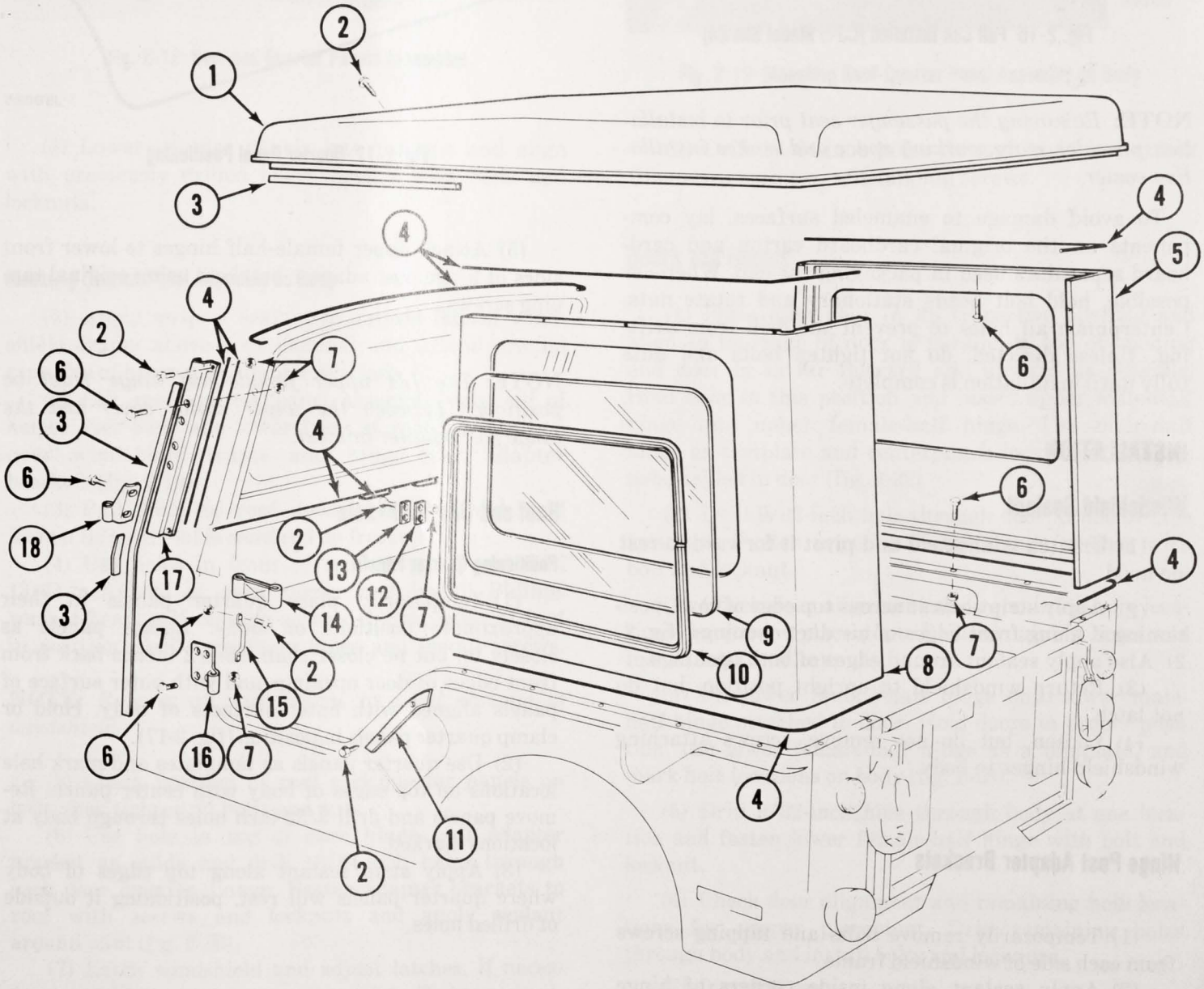
(4) Cover exposed joint sealant with matching enamel or lacquer.

(5) Check top ends of canopy sockets and grind flush with top edge of body where necessary.

FULL CAB

General

The following procedures cover installation of full cab kits on CJ-5 and CJ-6 models. CJ-6 installations require side adapter panels and a larger roof. Except for these components, installation is the same as for the CJ-5. Full cab components and hardware are illustrated in figures 2-15 and 2-16.



1. ROOF
2. SCREW
3. RUBBER MOULDING
4. SEALANT
5. QUARTER PANEL, R.H.
6. BOLT
7. LOCKNUT
8. QUATER PANEL, L.H.
9. GLASS
10. GASKET
11. FILLER STRIP
12. SPACER
13. STRIKER
14. STRAP
15. FOOTMAN LOOP
16. HINGE
17. ADAPTER BRACKET
18. HINGE

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Fig. 2-15 Full Cab Components and Hardware (CJ-5 Model Shown)

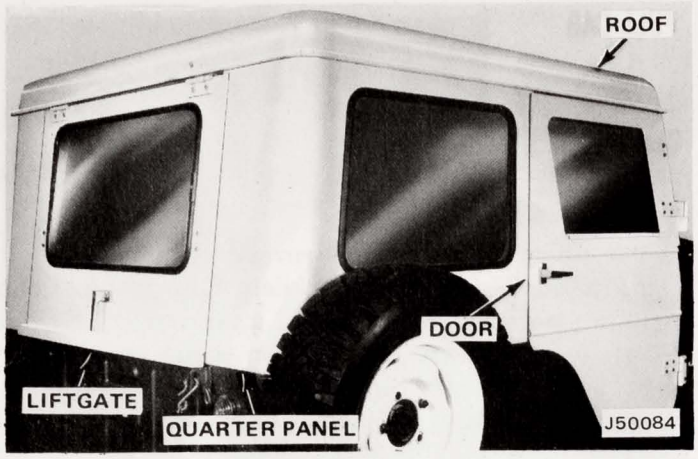


Fig. 2-16 Full Cab Installed (CJ-5 Model Shown)

NOTE: *Removing the passenger seat prior to installation provides more working space and makes installation easier.*

To avoid damage to enameled surfaces, lay components on the original cardboard carton and cardboard separators used in packaging the cab. Wherever possible, hold bolt heads stationary and rotate nuts. Centerpunch all holes to prevent the drill from drifting. Unless directed, do not tighten bolts and nuts fully until installation is complete.

INSTALLATION

Windshield Sealant

(1) Unlatch windshield and pivot it forward to rest on hood.

(2) Apply strip sealant across top edge of cowl, positioning it along front edges of air duct openings (fig. 2-2). Also apply sealant around edges of both openings.

(3) Return windshield to upright position, but do not latch.

(4) Loosen, but do not remove, screws attaching windshield hinges to body.

Hinge Post Adapter Brackets

(1) Temporarily remove bolts and tapping screws from each side of windshield frame.

(2) Apply sealant along inside corners of hinge post adapter brackets (fig. 2-3).

(3) Position hinge post adapter brackets on sides of windshield frame, aligning adapter holes with existing holes in frame.

(4) Secure upper sides of hinge post adapter brackets to windshield frame using bolts, lockwashers, and nuts.

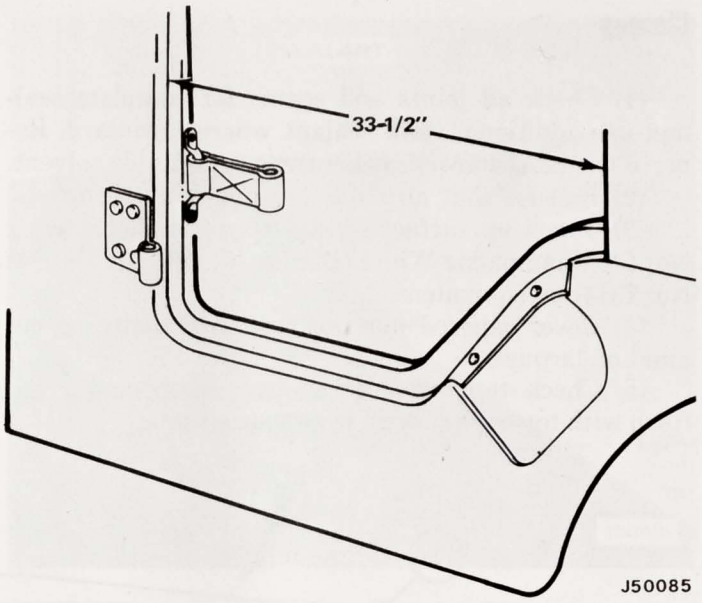


Fig. 2-17 Quarter Panel Positioning

(5) Attach upper female-half hinges to lower front sides of hinge post adapter brackets using original tapping screws.

NOTE: *The LH upper female-half hinge must be positioned between the wiper motor cover and the hinge post adapter bracket.*

Roof and Quarter Panels

Positioning Quarter Panels

(1) Temporarily place quarter panels in their approximate positions on body. Locate panels as closely to, but no closer than, 33-1/2 inches back from front edges of door openings and with outer surface of panels aligned with outer surfaces of body. Hold or clamp quarter panels in position (fig. 2-17).

(2) Use quarter panels as templates and mark hole locations on top edges of body with center punch. Remove panels and drill 9/32-inch holes through body at locations marked.

(3) Apply strip sealant along top edges of body where quarter panels will rest, positioning it outside of drilled holes.

Assembling Roof and Quarter Panels

(1) Apply strip sealant to top quarter edges of quarter panels (fig. 2-18).

(2) Place quarter panels on roof (with roof upside down in carton for protection) so that mating holes are aligned. Fasten each panel to roof with bolts and locknuts.

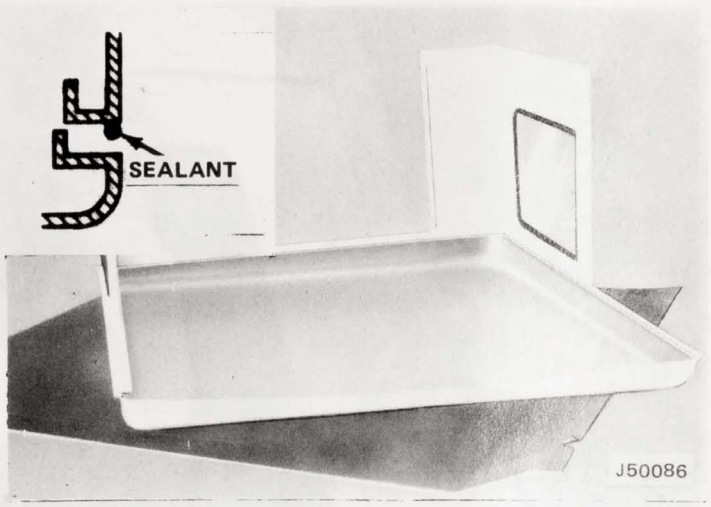


Fig. 2-18 Roof and Quarter Panels Assembled

Fig. 2-19 Mounting Roof-Quarter Panel Assembly on Body

(3) Lower quarter panels into position and align with previously drilled holes. Secure with bolts and locknuts.

Mounting Quarter Panel Assembly on Body

(1) Apply strip of sealant to outside face of windshield frame above roof channel and extend around top sides of hinge post adapter brackets.

(2) Lift roof/quarter panel assembly with aid of helper over body and lower front of roof into position over windshield frame and hinge post adapter brackets (fig. 2-19).

(3) Pull front of roof down tight on windshield frame. Be sure roof is centered on frame.

(4) Use holes in front of roof as guide and drill 13/64-inch hole at each corner and install Phillips washer-head, self-tapping screws to hold front of roof in position. Drill remaining holes and install screws.

NOTE: *Remove all drill filings to avoid damage to windshield.*

(5) Check position of roof and quarter panels on body then tighten all bolts and nuts.

(6) Use hole in top of each hinge post adapter bracket as guide and drill 13/64-inch holes through each door opening flange. Fasten adapter brackets to roof with screws and locknuts and apply sealant around joint (fig. 2-20).

(7) Latch windshield and adjust latches, if necessary, to allow complete angagement. Tighten windshield hinge attaching screws.

Filler Strip

(1) Position filler strip on LH body panel (fig. 2-21). Use filler strip as template and mark two holes locations.

(2) Drill 13/64-inch holes through body and attach filler strip with two self-tapping screws.

Doors and Hinges

(1) Place each door in its respective opening and align so top edge of door is parallel to top of opening and door is as far forward and upward as possible. Hold door in this position and insert upper male-half hinge into upper female-half hinge. Use male-half hinge as template and centerpunch locations for holes to be drilled in door (fig. 2-22).

(2) Drill 9/32-inch hole through door at one of hole locations. Fasten upper male-half hinge to door with bolt and locknut.

(3) Check door alignment and remaining hole locations for proper placement. Drill remaining holes and install bolts and locknuts.

(4) Fit lower female-half hinge onto lower male-half hinge attached to door. Hold doors in proper position, use lower female-half hinge as a template, and mark hole locations on body (fig. 2-23).

(5) Drill 9/32-inch hole through body at one location and fasten lower female-half hinge with bolt and locknut.

(6) Check door alignment and remaining hole locations for proper placement. Drill remaining holes through body and install bolts and locknuts.

(7) Install doors.

Door Striker

(1) Attach striker to quarter panels with screws and locknuts (fig. 2-8).

(2) Use spacers, if necessary, to permit proper engagement with door latch.

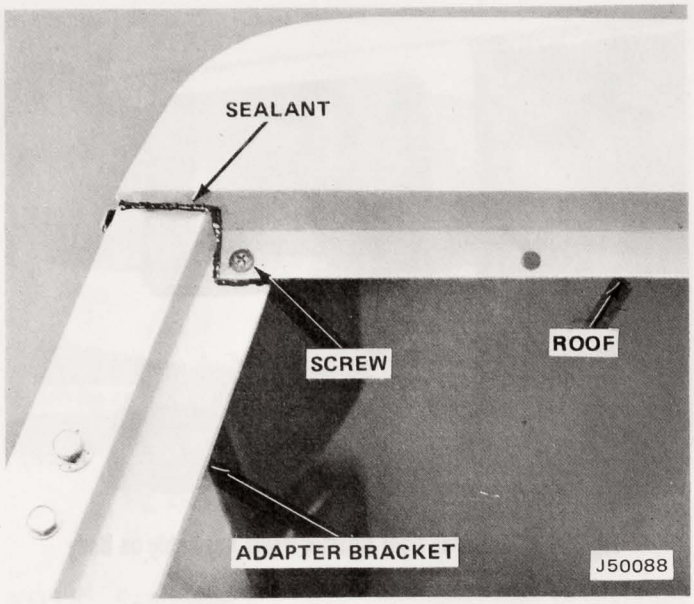


Fig. 2-20 Adapter Bracket Installed

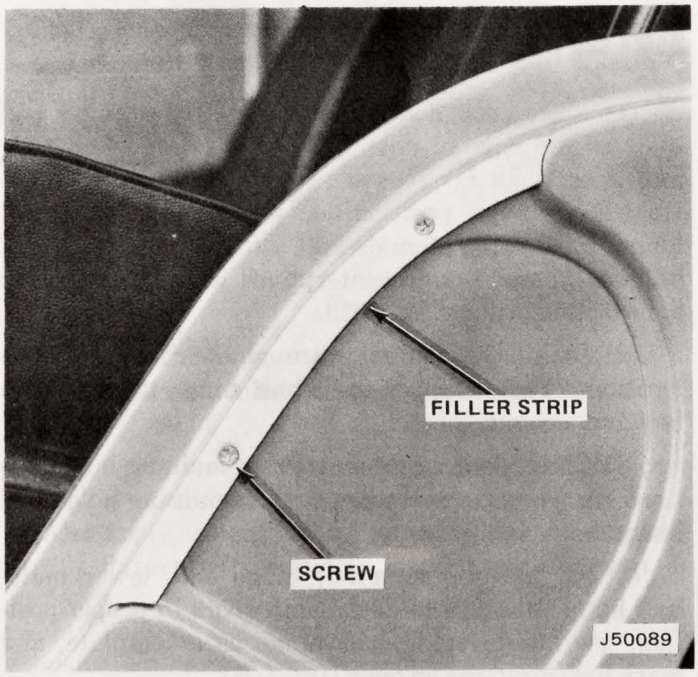


Fig. 2-21 Filler Strip Installed

Door Straps and Footman Loops

(1) Slip one end of door strap onto each door strap hook (fig. 2-9). Insert footman loop into opposite end of each door strap. Position each footman loop on respective body flange. Locate door strap so it is horizontal.

(2) Use footman loops as templates and mark hole locations on each body flange with center punch. Drill 7/32-inch holes through each flange at locations marked.

(3) Attach each footman loop to its respective body flange with oval-head screws and locknuts. Check for proper alignment and tighten.

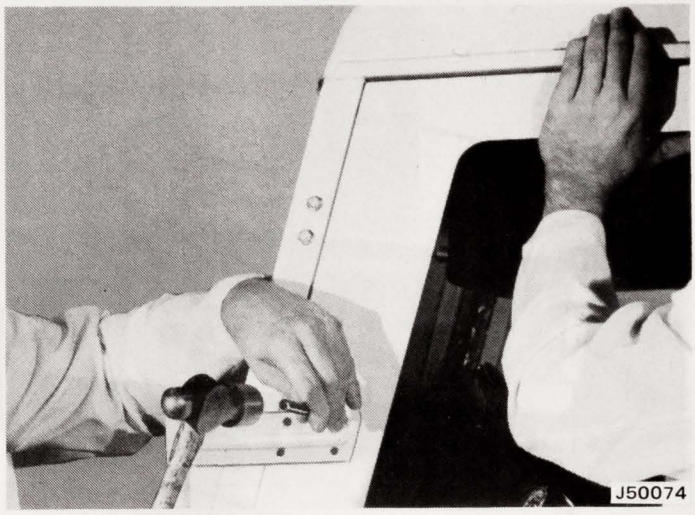


Fig. 2-22 Marking Hole Locations for Upper Male-Half Hinges

Vertical Rear Door

If vertical rear door is to be installed rather than the liftgate, refer to Vertical Rear Door Installation instructions listed under Cab Accessories.

Liftgate Hinges and Support Arms

(1) Attach hinges to roof with screws and locknuts (fig. 2-24).

(2) Attach support arms to liftgate by fastening right angle bracket end with bolts and locknuts.

Liftgate

(1) Position liftgate into its opening and secure to hinges with bolts and locknuts (fig. 2-25).

(2) Be sure that hinge assemblies are properly aligned and liftgate is positioned for minimum clearance at top. Tighten screws, bolts, and locknuts.

(3) Attach opposite ends of support arms to quarter panels with screws and locknuts.

Rubber Moulding Door Strips

A roll of pressure-sensitive rubber moulding is used for making door openings watertight. Proper application of the moulding is important.

NOTE: *Do not stretch moulding when applying.*

(1) Apply vertical strip of rubber moulding along edge of door (striker side), parallel to and 1/8 inch

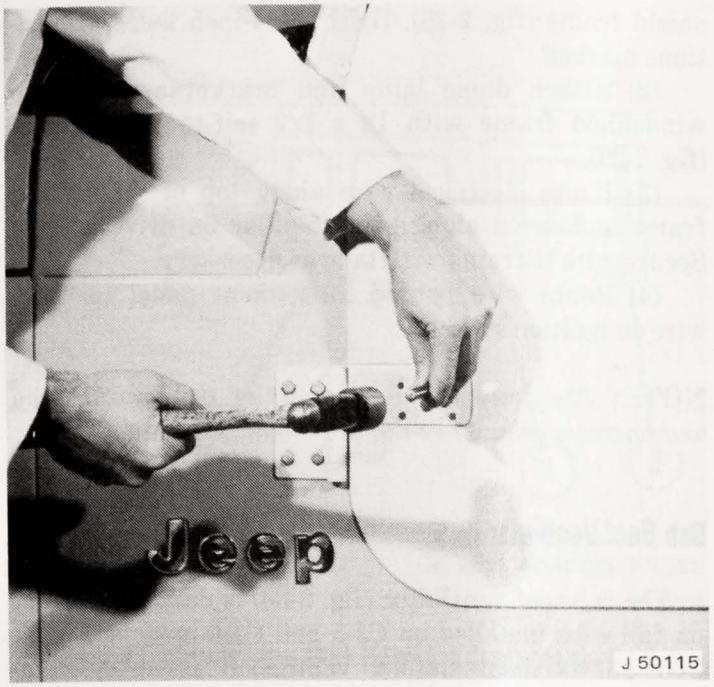


Fig. 2-23 Marking Locations for Lower Hinge Female-Half Hole

from outside edge, and extending from top of door to bottom corner (fig. 2-26).

(2) Butt second strip against lower end of vertical strip, parallel to and 1/8 inch from outside edge, and extend down along bottom of door and up hinge side. Trim surplus material and cut two vertical 1/4-inch wide drain channels at locations A and B (fig. 2-26).

(3) Apply horizontal strip along top of door opening, beginning on back side of adapter bracket, and extending around corner onto front edge of quarter panel.

(4) Apply vertical strip along front edge of door opening, but top of strip against bottom of horizontal strip, and extend it down to bottom of adapter bracket.

(5) Apply vertical strip from bottom of adapter bracket, extending it down to beginning of radius at bottom corner of door opening.

(6) Apply 8-inch strip at right angle to vertical strip installed above, with its top end at bottom of adapter bracket.

(7) Check door operation and adjust strikers if necessary.

Liftgate Rubber Moulding

(1) Apply horizontal strip of rubber moulding along bottom of liftgate.

(2) Apply vertical strips along each side of liftgate, parallel to and 1/8 inch from outside edges, and extending from top edge of liftgate down to butt against horizontal strip.

(3) Apply horizontal strip along top of liftgate opening, positioning it between hinges.

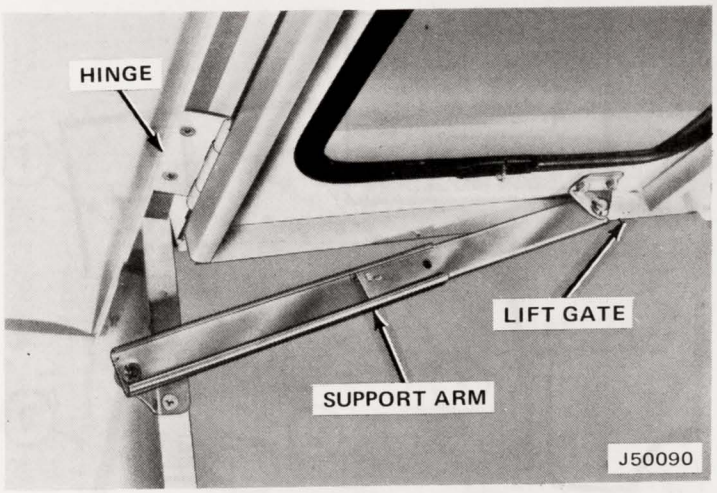


Fig. 2-24 Liftgate Hinges and Support Arms Installed

Fig. 2-25 Liftgate Installed

(4) Apply two short strips along top of liftgate opening, positioning them between each hinge and outside corner of opening.

(5) Apply liftgate hinge rubber seal on each liftgate hinge, aligning it with rubber moulding.

Cleanup

(1) Check all joints and seams for complete sealing. Use additional strip sealant where necessary. Remove excess sealant with kerosene or suitable solvent.

(2) Be sure that all bolts and nuts are tightened.

(3) Touch up surface scratches or blemishes With No. 432 Champagne White (Ditzler No. 8818 or Dupont No. 7314) or equivalent.

(4) Cover exposed joint sealant with matching enamel or lacquer.

(5) Check top ends of canopy sockets and grind flush with top edge of body where necessary.

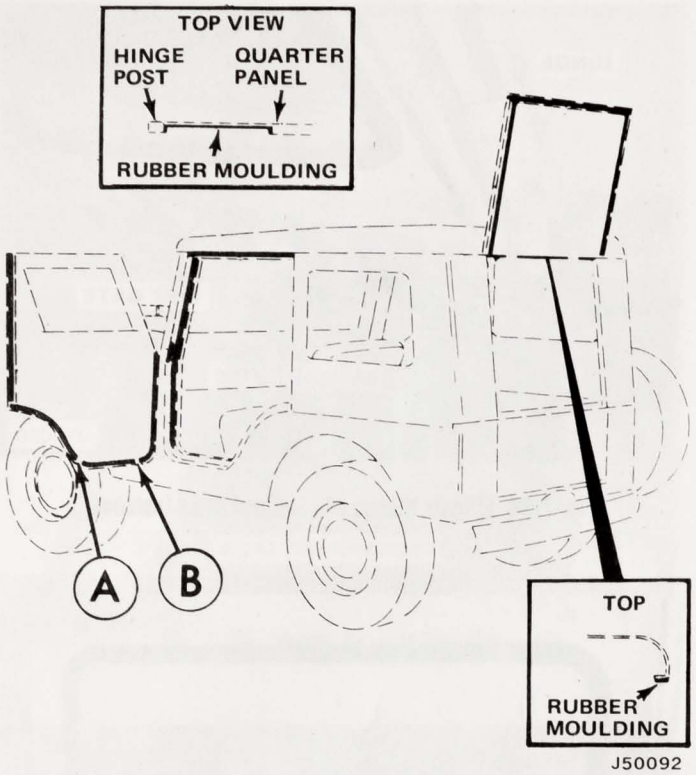


Fig. 2-26 Rubber Moulding Installed

MARK III CAB

General

The Mark III cab (fig. 2-27) is used on CJ-5 and CJ-6 models and is a deluxe version of the standard full cab. It includes a headlining in the roof assembly, additional windows in the quarter panels, and a dome lamp. The side adapter panels for CJ-6 models also have windows.

INSTALLATION

Installation procedures for the Mark III cab are identical to those described for the standard full cab in this section.

CAB ACCESSORIES

Dome Lamp

The dome lamp (fig. 2-28) can be installed in full or half cabs and is grounded electrically through the two self-tapping mounting screws. Be sure there is good metal-to-metal contact between the mounting screws and the bracket.

(1) Use dome lamp mounting bracket as template and mark two hole locations on top center of windshield frame (fig. 2-28). Drill 11/64-inch holes in locations marked.

(2) Attach dome lamp and bracket assembly to windshield frame with 12 x 1/2 self-tapping screws (fig. 2-29).

(3) Route electrical wire along top of windshield frame and down along side of pillar on driver's side. Secure wire to frame with tape as necessary.

(4) Route wire behind instrument panel to "hot" wire on ignition switch.

NOTE: *The lamp is independent of the ignition key and operates only when dome switch is activated.*

Cab Roof Ventilator

The cab roof ventilator (fig. 2-30) is designed for use on full cabs installed on CJ-5 and CJ-6 models. Figure 2-31 shows disassembled ventilator assembly components. A template is provided for accurate locating of the opening required for the ventilator assembly.

(1) Cut hole in template where indicated. Place template on top of roof. Be sure that roof and rib centerlines are properly aligned. Tape template securely in place.

(2) Scribe or mark outline of opening on roof and remove template.

(3) Cut roof opening. Bevel edges slightly and remove burrs.

(4) Install narrow slot of weatherstrip over edge of roof opening (refer to enlarged section view on template), extending weatherstrips completely around to frame the opening. Be sure weatherstrip ends butt tightly together.

(5) Separate ventilator frame from ventilator handle assembly by removing rod (fig. 2-31).

(6) Place outside edge of ventilator frame in wide slot of weatherstrip, beginning at one corner. Use suitable tool to guide edge of frame into entire slot.

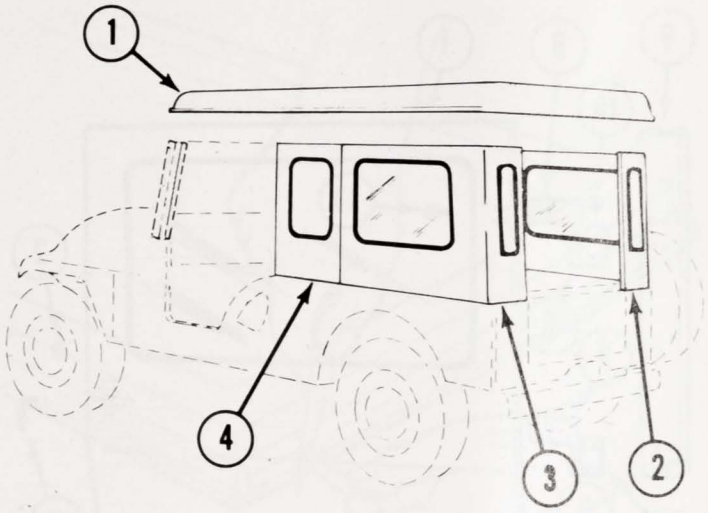
(7) Lubricate filler strip with liquid detergent or soapy water. Use seal insert installer or suitable tool to force filler strip into groove on top of weatherstrip. Cut off excess, if any, so that ends butt tightly together.

(8) Position ventilator handle assembly in ventilator frame and install rod and screens.

(9) Touch up cab roof ventilator as required with No. 432 Champagne White (Ditzler No. 8818 or Dupont 7314) or equivalent.

Vertical Rear Door

The vertical rear door installation on the full cab is described in the following procedures (fig. 2-32).



1. ROOF AND HEADLINER
2. QUARTER PANEL, R.H.
3. QUARTER PANEL, L.H.
4. SIDE ADAPTER PANEL

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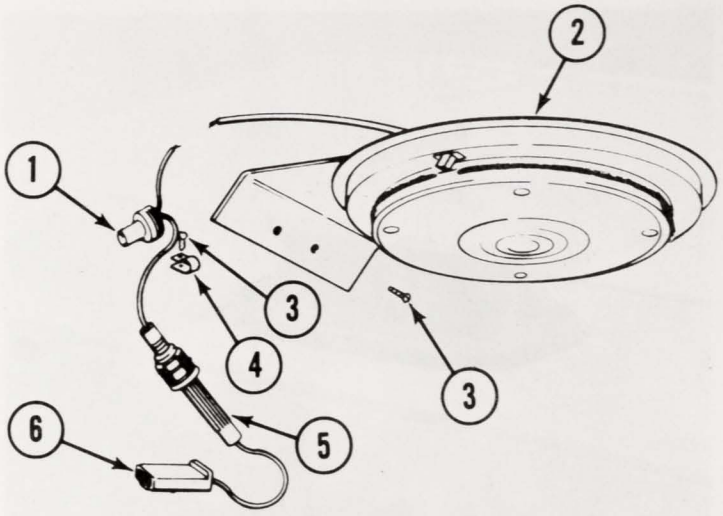
Fig. 2-27 Distinguishing Mark II Full Cab Components—CJ-6



1. CONNECTOR
2. DOME LAMP
3. SCREW
4. CLAMP
5. FUSE ASSEMBLY
6. SPADE TERMINAL

J50094

Fig. 2-28 Dome Lamp Components and Wiring

Vehicle Body Preparation

(1) Remove tailgate from its hinges and remove tailgate hinges from body.

(2) Use either cutting torch or chisel to carefully remove both chain bracket/latches from body. Grind flush with body and refinish to prevent metal deterioration.

Rubber Moulding Strips

A roll of pressure-sensitive rubber moulding is provided for making all openings watertight. Proper application is important. Do not stretch moulding when applying.

(1) Lay vertical rear door, with its inside surface facing up, on cardboard for protection.

(2) Apply vertical strip of rubber moulding (A, fig. 2-33) to flange on latch side of door, positioning one end at bottom corner. Extend strip upward to top of door, with edge of moulding butted against box section.

(3) Apply horizontal strip B to bottom flange of door, positioning it with one end even with outside edge of strip A and extending it to opposite edge of door.

(4) Apply vertical strip C to flange on hinge side door, butting one end against the edge of strip B. Extend strip upward to top edge of door, with edge of moulding butted against box section. Trim strip flush with edge of door with sharp knife or single-edge razor blade. Hold blade in a vertical position, stroking it smoothly up and down, using edge of door as a guide and using other hand to pull cutoff material away (fig. 2-34).

(5) Apply horizontal strip D to face of box section on top of door, extending it from one edge to the other, with top edge of moulding even with top edge of box section.

(6) Apply horizontal strip E directly over strip B on bottom flange of door.

(7) Apply vertical strips F directly over strips A and C, positioning each with one end butted against edge of strip E, and extending up to point where door bends. Trim strip on hinge side.

(8) Apply horizontal strip of rubber moulding across vertical flange on top of door opening. Position ends of strip against quarter panels, with top edge of moulding flush against horizontal surface.

Hinges

(1) Attach upper hinges to vertical rear door assembly with bolts and locknuts (fig. 2-32).

(2) Position and align door, with aid of helper, in opening and fit lower hinge on upper hinge.

(3) Use lower hinge as template and mark loca-

Fig. 2-29 Dome Lamp Installed

Fig. 2-30 Roof Ventilator Installed

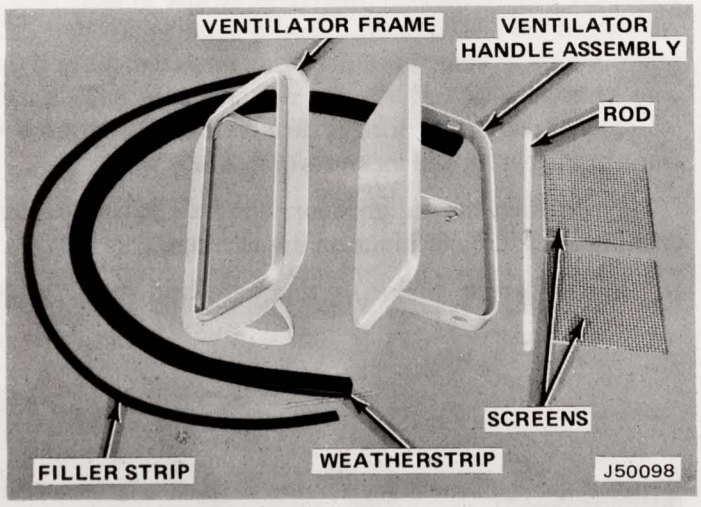
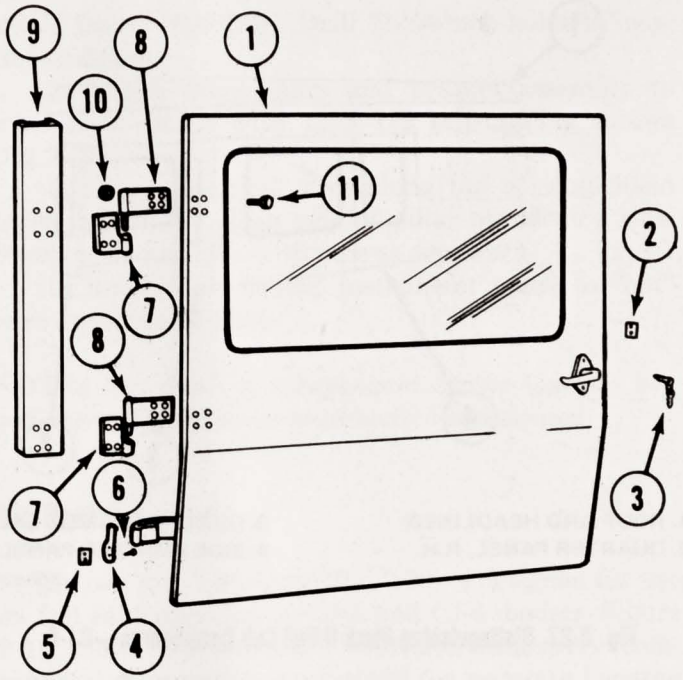


Fig. 2-31 Roof Ventilator Disassembled

tions for holes to be drilled in left quarter panel.

(4) Drill 9/32-inch hole through quarter panel at one hole location. Temporarily fasten hinge to quarter panel with bolt and locknut.

(5) Check door alignment and remaining hole locations for proper placement.



1. VERTICAL REAR DOOR
2. STRIKER
3. KEYS
4. HOOK
5. REINFORCEMENT
6. SCREW
7. LOWER HINGE
8. UPPER HINGE
9. REINFORCEMENT
10. LOCKNUT
11. BOLT

Fig. 2-32 Vertical Rear Door and Hardware

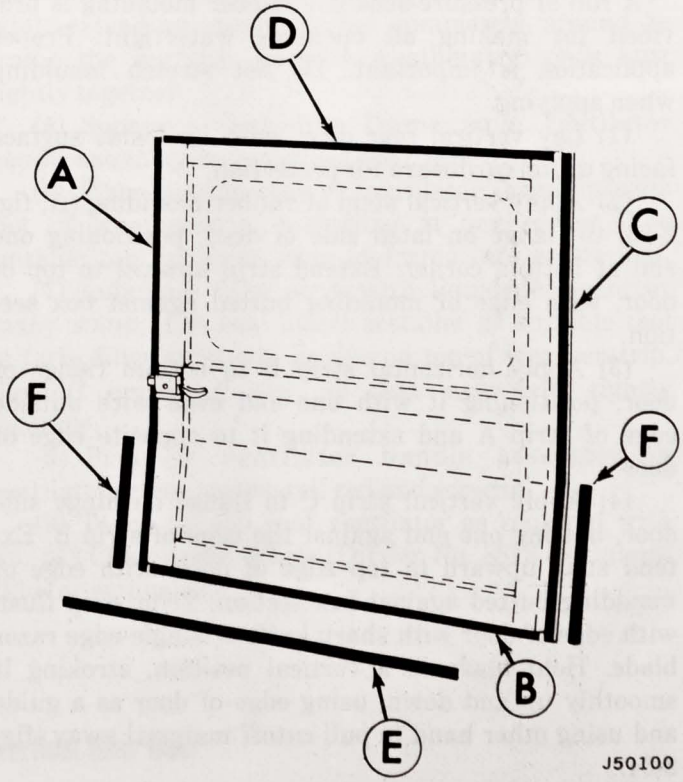


Fig. 2-33 Rubber Moulding Strips Installed

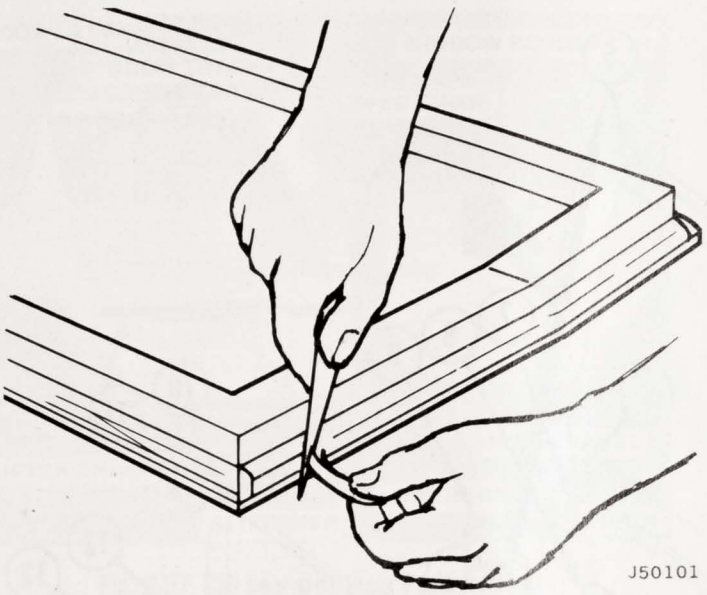


Fig. 2-34 Trimming Rubber Moulding Strip

(6) Remove hinge from quarter panel and drill remaining holes. Install hinge temporarily with bolts and locknuts.

(7) Hold door in proper position and fit lower hinge onto upper hinge (fig. 2-32). Use hinge as template and mark locations for holes to be drilled in left quarter panel.

(8) Drill 9/32-inch hole through quarter panel at one hole location and temporarily fasten hinge to quarter panel with bolt and locknut.

(9) Check door alignment and drill remaining holes through quarter panel using hinge as a guide.

(10) Remove door/upper hinge assembly from lower hinges. Remove lower hinges from quarter panel.

(11) Position hinge reinforcement inside left quarter panel in alignment with drilled holes (fig. 2-32). Install hinges with bolts and locknuts and install.

(12) Install door.

Door Check Components

(1) Open door to desired position (over 90° from closed position). While holding door in this position, swing end of door check rod into position over rear edge of floor and mark location (fig. 2-35).

(2) Drill 3/8-inch hole through floor at location previously marked and place end of door check rod into hole to hold door open.

(3) Hold door open using check rod and insert door strap hook into end loop of strap. Pull strap tight with hook, locate hook on side of wheelhousing, and use hook as template to mark hole locations.

(4) Drill 9/32-inch holes through wheelhousing at locations marked, and attach door strap hook to wheelhousing with bolts and locknuts.

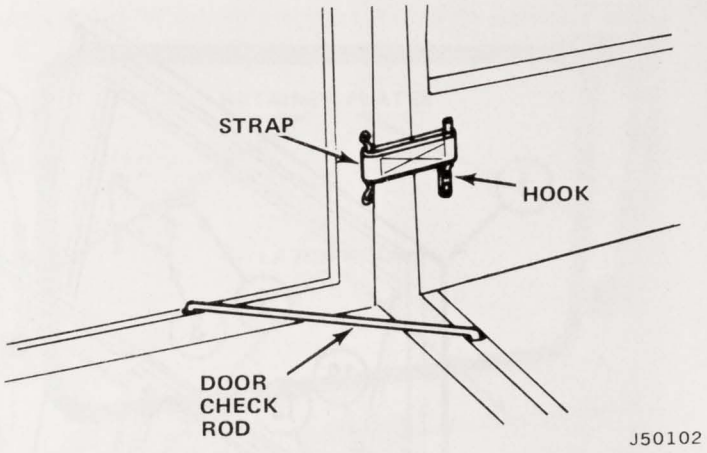


Fig. 2-35 Door Check Components

Striker

(1) Mark right quarter panel where door latch contacts. Use mark as a guide, locate striker on quarter panel, and mark hole locations.

(2) Drill two 7/32-inch holes through quarter panel at locations marked, and attach striker plate with screws and locknuts.

REPAIR/REPLACEMENT OF CAB COMPONENTS

Cab Doors

The cab door components and hardware items described and illustrated in figures 2-36 and 2-37 are common to half cabs and full cabs.

Door Latch and Outside Handle Removal

(1) Drill out rivets securing door latch to door (fig. 2-36). Remove latch.

(2) Remove screws and lockwashers securing outside handle. Remove handle and gasket.

Window Regulator Handle Removal

Remove screw from window regulator handle and remove handle.

Inner Door Panel Removal

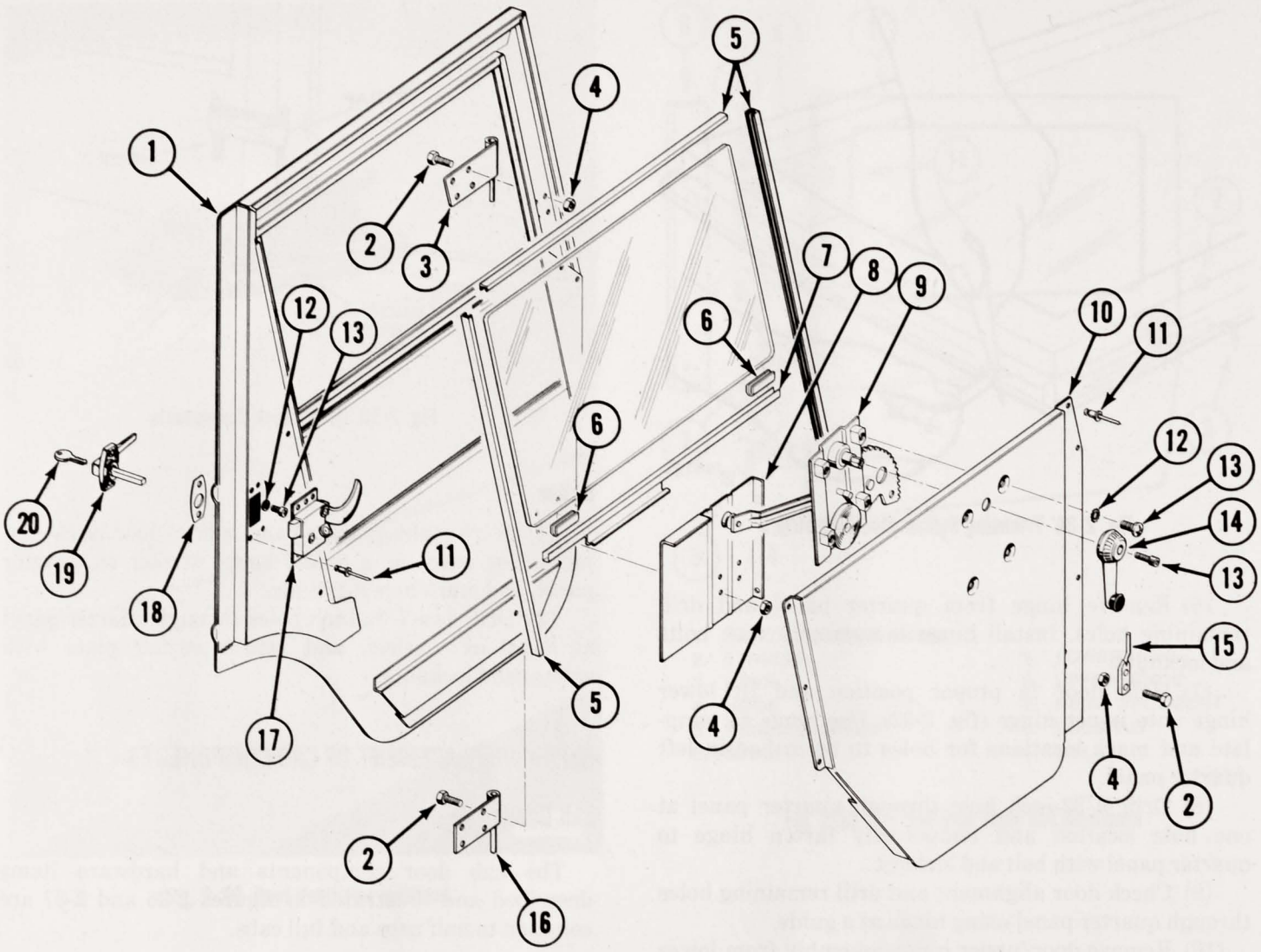
(1) Drill out rivets securing inner panel to door (fig. 2-37).

(2) Slide panel forward to disengage window regulator arm from lifter channel and remove panel.

Window Regulator Removal

(1) Remove window regulator handle (fig. 2-36).

(2) Remove inner door panel.



1. DOOR
2. BOLT
3. UPPER HINGE
4. LOCKNUT
5. WINDOW TRACK
6. SEAL STRIP
7. LIFTER CHANNEL
8. STIFFENER
9. WINDOW REGULATOR
10. INNER PANEL
11. RIVET
12. LOCKWASHER
13. SCREW
14. REGULATOR HANDLE
15. HOOK
16. LOWER HINGE
17. DOOR LATCH
18. GASKET
19. OUTSIDE HANDLE
20. KEY

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Fig. 2-36 Cab Door Components

(3) Remove screws and lockwashers attaching window regulator to inner door panel. Remove regulator.

Cab Door Window Glass Removal

(1) Remove inner door panel (fig. 2-36).

(2) Remove bolts and locknuts securing lower hinge and door stiffener to door. Remove hinge and stiffener.

(3) Slide window glass out. If glass is to be replaced, remove lifter channel and two seal strips.

Cab Door Window Track Replacement

(1) Break adhesive bond with putty knife while pulling window track free over entire length (fig. 2-36). Remove window track.

(2) Apply 1/8-inch bead of 3M Super Weatherstrip Adhesive (or equivalent) over entire length of window channel.

(3) Position window track in door channel, starting at top, and press firmly into position.

Fixed Window Glass and Gasket Replacement

(1) Insert fiber stick or suitable tool into gasket to unsnap. Use finger to unlock entire length of gasket.

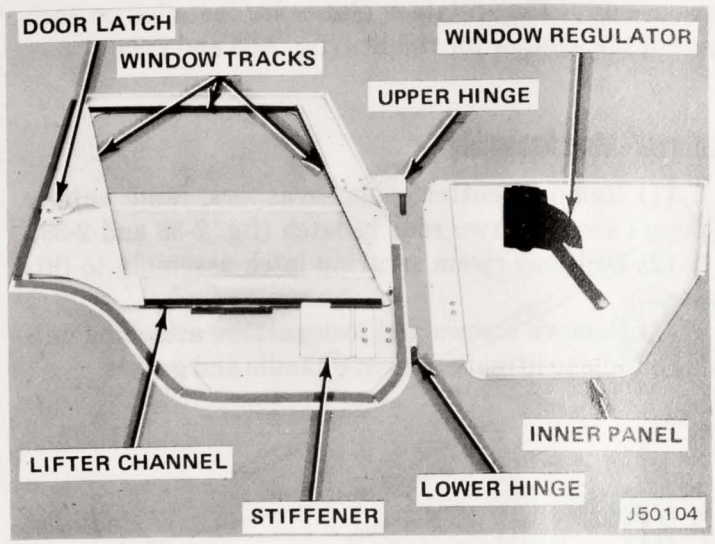


Fig. 2-37 Cab Door with Inner Panel Removal

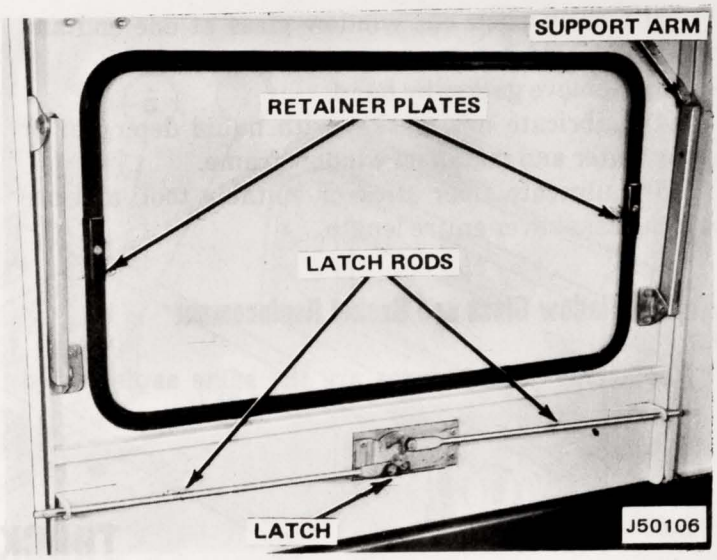
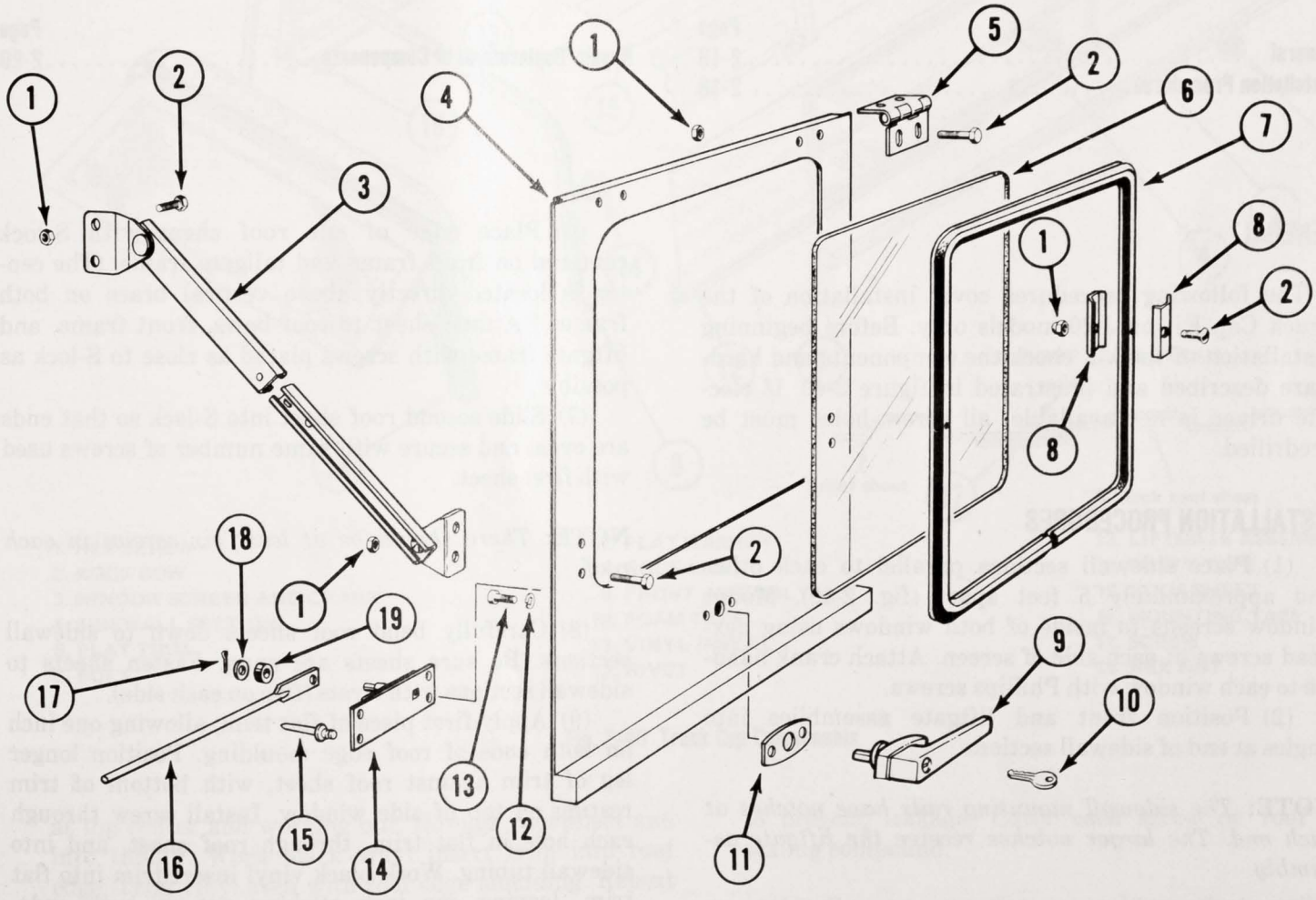


Fig. 2-38 Latch and Rod Assembly



1. LOCKNUT
2. BOLT
3. SUPPORT ARM
4. LIFTGATE
5. HINGE
6. GLASS
7. WEATHERSEAL
8. RETAINER PLATE
9. OUTSIDE HANDLE
10. KEY
11. GASKET
12. LOCKWASHER
13. SCREW
14. LATCH
15. RIVET
16. LATCH ROD
17. COTTER PIN
18. WASHER
19. RUBBER SPACER

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Fig. 2-39 Liftgate Components

(2) Gently push out window glass at one end and remove.

(3) Remove gasket by hand.

(4) Lubricate new gasket with liquid detergent or soapy water and install on window frame.

(5) Lubricate fiber stick or suitable tool, and use to lock gasket over entire length.

Liftgate Window Glass and Gasket Replacement

Replacement procedures are the same as described above except that retainer plates are installed on each side of the window for rigidity (fig. 2-38 and 2-39).

Liftgate Latch Assembly

(1) Remove cotter pins, washers, and rubber spacers securing two rods to latch (fig. 2-38 and 2-39).

(2) Drill out rivets securing latch assembly to liftgate.

(3) Remove screws and lockwashers attaching outside handle to liftgate. Remove handle and gasket.

TRUCK CAP KIT

GENERAL

The following procedures cover installation of the Truck Cap Kit on J-20 models only. Before beginning installation of the kit, check the components and hardware described and illustrated in figure 2-40. If electric driver is not available, all screw holes must be predrilled.

INSTALLATION PROCEDURES

(1) Place sidewall sections parallel to each other and approximately 5 feet apart (fig. 2-40). Mount window screens to inside of both windows using hex-head screws at each side of screen. Attach crank handles to each window with Phillips screws.

(2) Position front and liftgate assemblies into angles at end of sidewall sections.

NOTE: *The sidewall mounting rails have notches at each end. The larger notches receive the liftgate assembly.*

(3) Secure front and liftgate assemblies to sidewall sections by installing rivets in each corner of the assemblies.

(4) Position three roof bows (25 inches, 50 inches, and 75 inches) from outside of liftgate frame. Secure roof bows to sidewall sections at each end with hex-head screws.

(5) Apply a strip of white foam tape to top of each roof bow.

(6) Place edge of one roof sheet with S-lock centered on front frame and tailgate frame. (The center is located directly above vertical brace on both frames.) Attach sheet to roof bows, front frame, and liftgate frame with screws placed as close to S-lock as possible.

(7) Slide second roof sheet into S-lock so that ends are even, and secure with same number of screws used with first sheet.

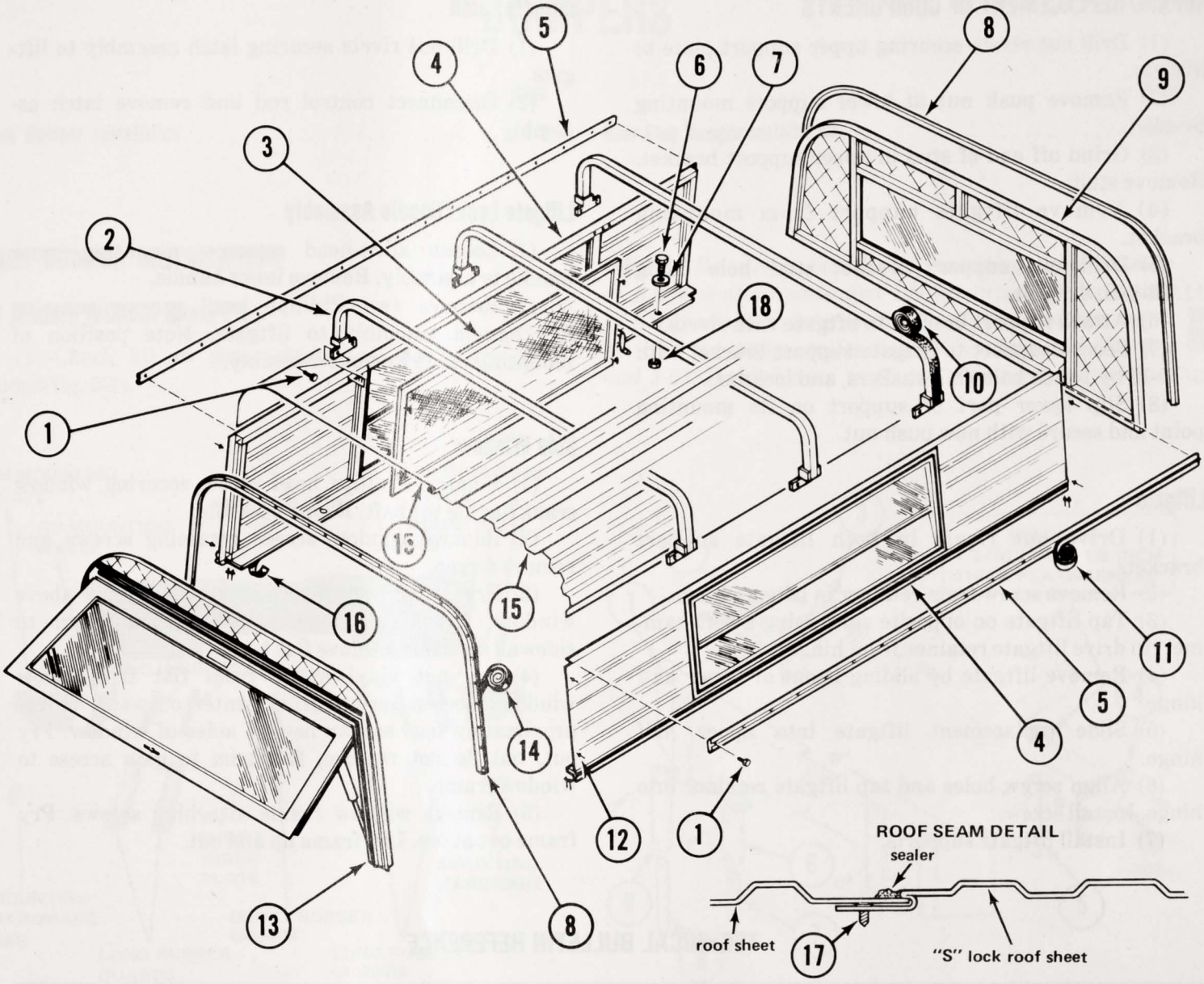
NOTE: *There should be at least six screws in each roof.*

(8) Carefully bend roof sheets down to sidewall sections. Be sure sheets are snug. Fasten sheets to sidewall sections with rivets (five on each side).

(9) Apply first piece of flat trim, allowing one inch on both ends of roof edge moulding. Position longer leg of trim against roof sheet, with bottom of trim resting on top of side window. Install screw through each hole in flat trim, through roof sheet, and into sidewall tubing. Work black vinyl insert trim into flat trim, leaving one inch sticking out on both ends. Repeat on other side.

(10) Lay a piece of 3/4-inch putty tape on each edge of roof sheet, starting at bottom of one side and running over roof to other side. Push down slightly on tape and remove white paper.

(11) Apply piece of preformed roof edge to end of cap (on top of putty tape). Be careful to make ends even with bottom of cap. Tuck 1 inch of vinyl under roof edge and install screw through each hole, starting



1. HEX SCREW
2. ROOF BOW
3. WINDOW SCREEN AND CRANK
4. SIDEWALL SECTION
5. FLAT TRIM
6. BOLT
7. FLAT WASHER
8. ROOF EDGE
9. FRONT ASSEMBLY
10. FOAM TAPE
11. VINYL INSERT
12. RIVET
13. LIFTGATE ASSEMBLY
14. PUTTY TAPE
15. ROOF SHEET
16. MOUNTING TAPE
17. SCREW
18. HEX NUT

Fig. 2-40 Truck Cap Components

at top center and working out, through roof sheet and into tubing. Work black vinyl insert trim into roof edge. Trim vinyl even with roof edge moulding. Repeat on other end.

(12) Install two flat-head screws (from bottom of cap) through mounting rail into tubing. Repeat at each corner of cap.

(13) Apply vinyl insert into roof edge by squeezing roll end and tucking it under channel lips. Do not stretch vinyl.

(14) Apply heavy application of sealing compound along entire seam length where roof sheets are joined to prevent leakage. Cover each screw on roof with sealing compound.

(15) Remove any dirt or moisture from rail and carefully lay mounting tape over stake pockets on both sides. Apply two layers on front rails. Align cap on truck box. Be sure inside mounting rails are even with inside of box and door shuts easily with tight fit on liftgate.

(16) Position cap on truck. Drill three evenly spacer 3/8-inch holes through both mounting rails and truck rails. Install bolts, nuts, and washers.

REPAIR/REPLACEMENT OF COMPONENTS

(1) Drill out rivets securing upper support plate to liftgate.

(2) Remove push nut at lower support mounting bracket.

(3) Grind off end of stud in upper support bracket. Remove stud.

(4) Remove liftgate support from mounting bracket.

(5) Drill out support bracket stud hole using 11/32-inch drill bit.

(6) Attach support bracket to liftgate with rivets.

(7) Secure support to liftgate support bracket with 5/16-18 by 1-inch bolt, flat washers, and locknut.

(8) Slip lower part of support on its mounting point and secure with new push nut.

Liftgate

(1) Drive out rivets in both liftgate support brackets.

(2) Remove screw from retainer in liftgate hinge.

(3) Tap liftgate on opposite side, using a soft hammer, to drive liftgate retainer from hinge.

(4) Remove liftgate by sliding it out of upper half hinge.

(5) Slide replacement liftgate into upper half hinge.

(6) Align screw holes and tap liftgate retainer into hinge. Install screw.

(7) Install liftgate supports.

Liftgate Latch

(1) Drill out rivets securing latch assembly to liftgate.

(2) Disconnect control rod and remove latch assembly.

Liftgate Lock/Handle Assembly

(1) Loosen allen-head setscrew mounting inner handle to assembly. Remove inner handle.

(2) Remove two Phillips head screws securing lock/handle assembly to liftgate. Note position of mounting plate. Remove assembly.

Side Window

(1) Remove Phillips head screw securing window crank handle to shaft. Remove handle.

(2) Remove window screen retaining screws and remove screen.

(3) Pry out vinyl insert from flat trim above window. Remove screws attaching flat trim to sidewall sections. Remove flat trim.

(4) Pry out vinyl insert from flat trim below window. Loosen screws from center outward, to approximately four screws beyond sides of window. Pry out, but do not remove, flat trim to gain access to window frame.

(5) Remove window frame attaching screws. Pry frame out at top. Lift frame up and out.

TECHNICAL BULLETIN REFERENCE

Date	TB No.	Subject	Changes Information on Page No.

BUMPERS

PUSH BUMPER INSTALLATION

CJ Models Without Snow Plow

(1) Check kit to determine if all parts are included(fig. 3-1).

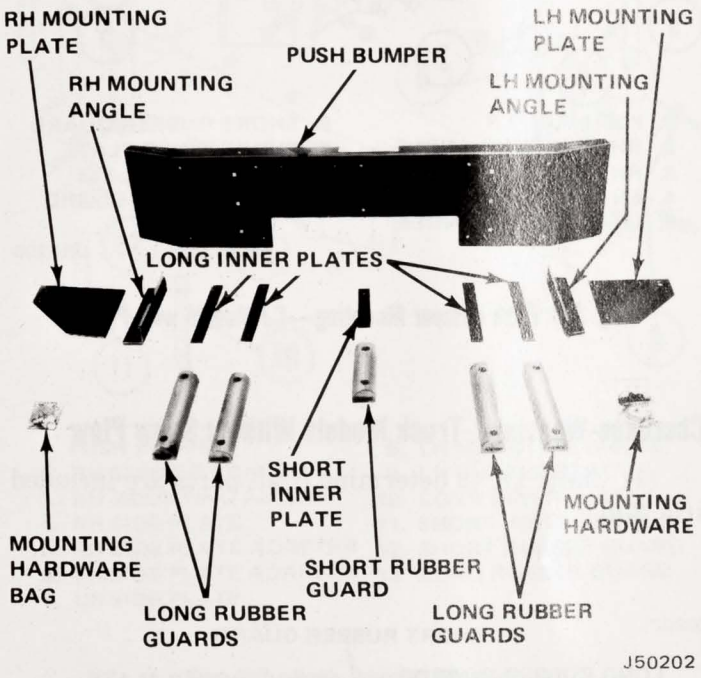


Fig. 3-1 Push Bumper Kit Components—CJ Models

(2) Remove nuts and bolts securing original front bumper to frame and remove bumper.

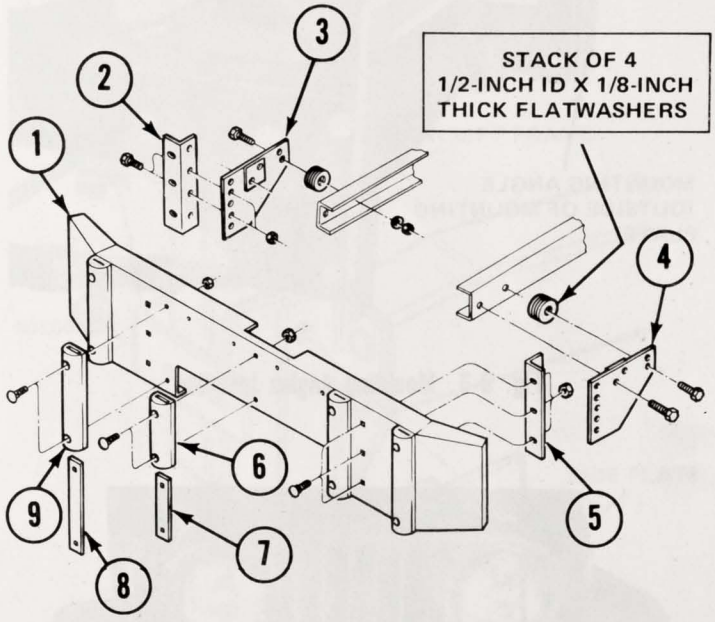
(3) Remove screws and lockwashers securing steering gear to bracket, and swing steering gear out of way.

(4) Position mounting plates on frame rails and install bolts in outboard holes of rails (fig. 3-2). Secure bolts with flat washers and locknuts, but do not tighten.

(5) Assemble two stacks of four 1/2-inch ID by 1/8-inch thick flat washers and position one stack between each frame rail and mounting plate at inboard hole. Install bolts and secure with flat washers and locknuts (fig. 3-2). Tighten nuts to 60 to 70 foot-pounds torque.

(6) Position mounting angles on mounting plates and secure with bolts and locknuts (fig. 3-3)

NOTE: *Be sure to install RH mounting angle* **outside** *of RH mounting plate and LH mounting angle* **inside** *of LH mounting plate so that mounting holes in bumper and mounting angles will be in alignment (fig. 3-2 and 3-3). Tighten nuts to 60 to 70 foot-pounds torque.*



1. PUSH BUMPER
2. RH MOUNTING ANGLE
3. RH MOUNTING PLATE
4. LH MOUNTING PLATE
5. LH MOUNTING ANGLE
6. SHORT RUBBER GUARD
7. SHORT INNER PLATE
8. LONG INNER PLATE
9. LONG RUBBER GUARD

Fig. 3-2 Push Bumper Kit Exploded View—CJ Models Without Snow Plow

(7) Position push bumper on mounting angles and install carriage bolts and locknuts (fig. 3-2). Tighten nuts to 40 foot-pounds torque.

(8) Insert short inner plate into short rubber guard, aligning holes in guard with holes in plate.

(9) Position short rubber guard assembly at center of bumper and install carriage bolts and locknuts. Tighten nuts to 40 foot-pounds torque.

(10) Install front license plate on bumper, if required (fig. 3-4).

Fig. 3-3 Mounting Angles Installed

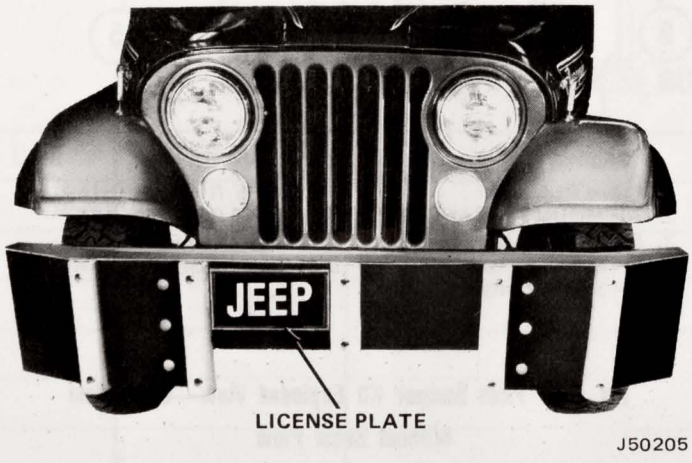


Fig. 3-4 Push Bumper Installed

CJ Models with Snow Plow

Installation procedures for mounting the push bumper with snow plow are identical to those for mounting the push bumper without plow, except that the plow mounting frame members are positioned between the push bumper mounting plates and frame rails (fig. 3-5).

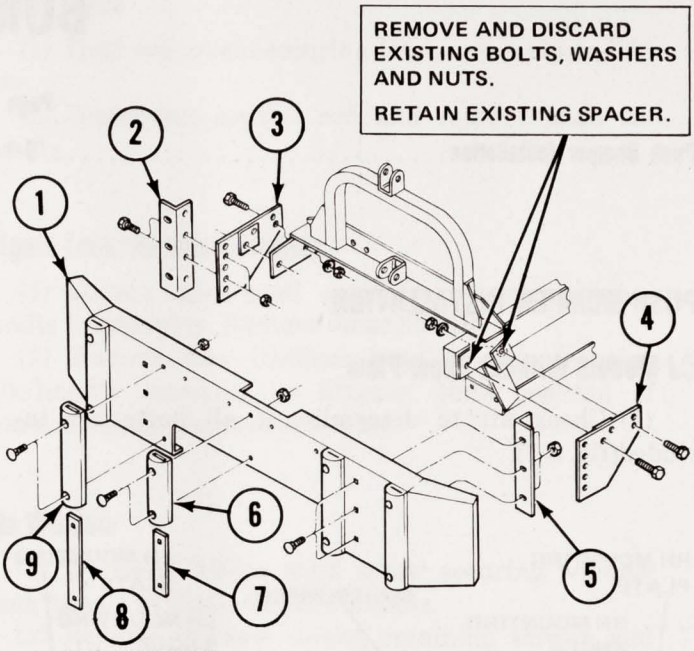


Fig. 3-5 Push Bumper Mounting—CJ Models with Plow

Cherokee-Wagoneer-Truck Models Without Snow Plow

(1) Check kit to determine if all parts are included (fig. 3-6).

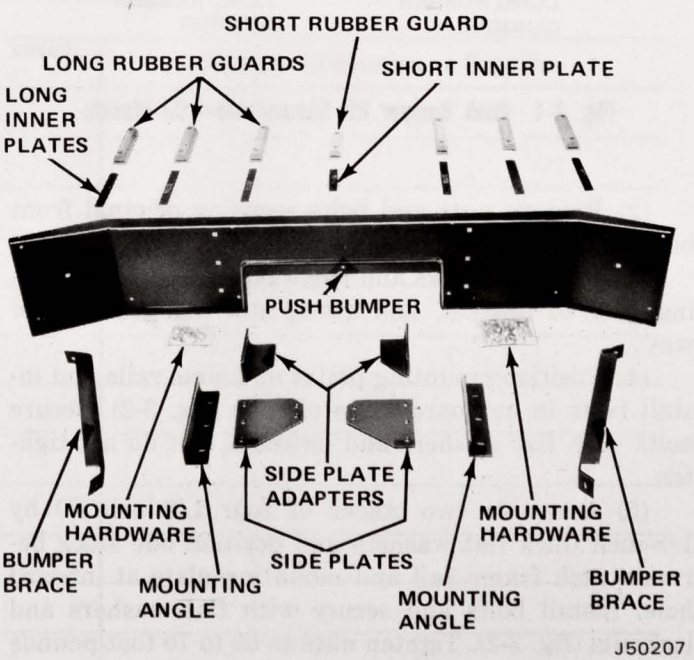
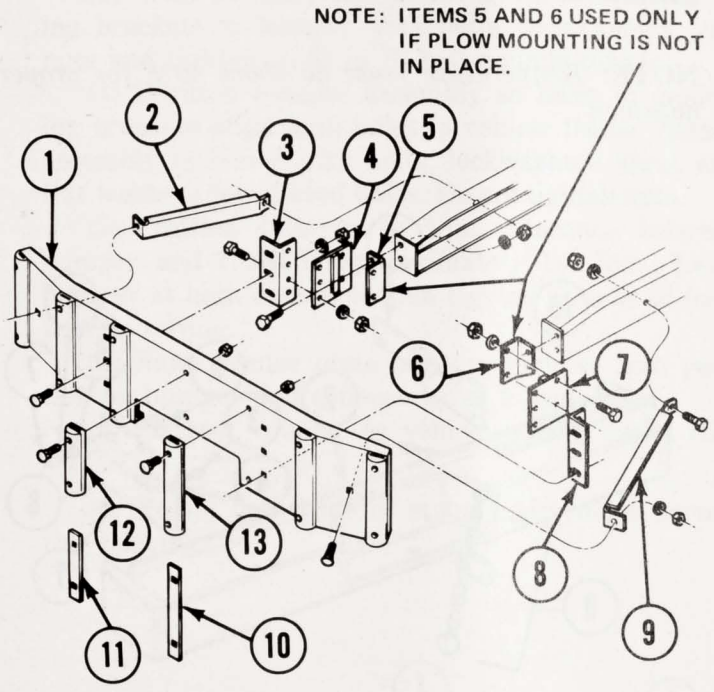


Fig. 3-6 Push Bumper Kit Components—Cherokee-Wagoneer-Truck Models

(2) Remove front bumper sections and brackets.

(3) Attach side plate adapters to vehicle frame horns with 1/2-inch diameter by 1-1/4-inch long bolts, flat washers, and locknuts (fig. 3-7). To ensure flat surfaces, it may be necessary to enlarge holes in the frame horns or to grind frame horns.



1. PUSH BUMPER
2. RH BUMPER BRACE
3. RH MOUNTING ANGLE
4. RH SIDE PLATE
5. RH SIDE PLATE ADAPTER
6. LH SIDE PLATE ADAPTER
7. LH SIDE PLATE
8. LH MOUNTING ANGLE
9. LH BUMPER BRACE
10. LONG INNER PLATE
11. SHORT INNER PLATE
12. SHORT RUBBER GUARD
13. LONG RUBBER GUARD

Fig. 3-7 Push Bumper Mounting— Cherokee-Wagoneer-Truck Models Without Snow Plow

(4) Attach side plates to side plate adapters with 1/2-inch diameter by 1-1/4-inch long bolts, flat washers, and locknuts. Tighten attaching hardware to 70 to 80 foot-pounds torque.

(5) Position mounting angles vertically against side plates and align holes. Secure with 5/8-inch diameter by 1-1/2-inch long bolts, flat washers, and locknuts. Tighten attaching hardware to 70 to 80 foot-pounds torque.

NOTE: *Angles should be positioned so that bottom ends of angles are 10 to 11 inches from ground.*

(6) Insert short inner plate into short rubber guard and attach to bumper with 3/8-inch diameter by 1-1/4-inch long carriage bolts and locknuts. Do not overtighten.

(7) Following same procedure, install longer inner plates and long rubber guards.

(8) Position bumper on mounting angles, aligning holes and securing loosely with 1/2-inch diameter by 1-1/4-inch long carriage bolts, flat washers, and locknuts.

(9) Attach bumper braces to bumper with 1/2-inch diameter by 1-1/4-inch long carriage bolts, flat washers, and locknuts.

(10) Attach bumper braces to vehicle frame rails by using original bolts and nuts in holes used for original bumper brackets. Tighten all nuts and bolts.

Cherokee-Wagoneer-Truck with Snow Plow

(1) Check kit to determine if all parts are included (fig. 3-6).

(2) Remove front bumper sections and brackets.

(3) Burn two bumper clips off plow lift frame (fig. 3-8).

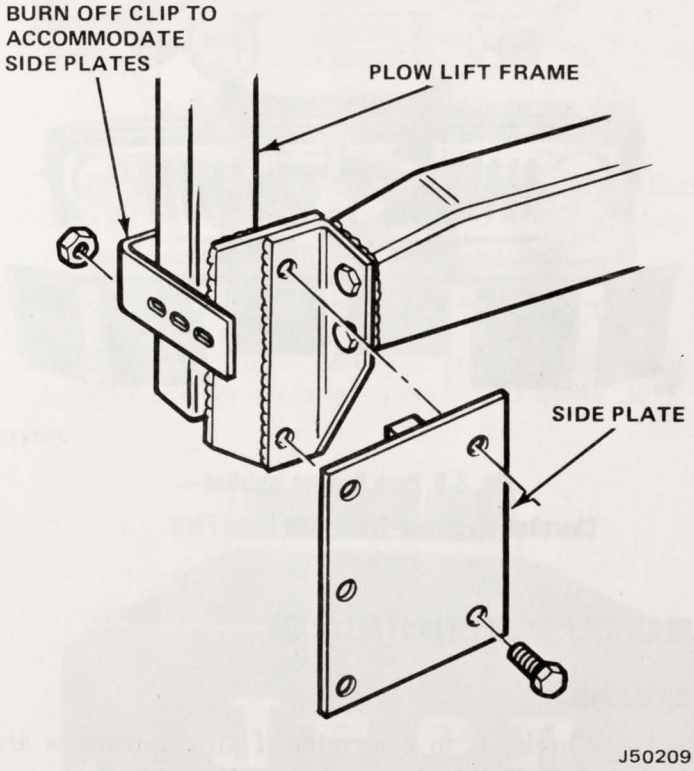


Fig. 3-8 Installing Side Plates

(4) Attach side plates to lift frame with 1/2-inch diameter by 1-1/4-inch long bolts, flat washers, and locknuts (fig. 3-8). Tighten locknuts to 70 to 80 foot-pounds torque.

(5) Position mounting angles vertically against side plates and align holes. Secure angles with 5/8-inch diameter by 1-1/2-inch long bolts, flat washers, and locknuts.

NOTE: *Angles should be positioned so that bottom ends of angles are 10 to 11 inches from ground.*

(6) Insert short inner plate into short rubber guard and attach to bumper with 3/8-inch diameter by 1-1/4-inch long carriage bolts and locknuts. Do not overtighten.

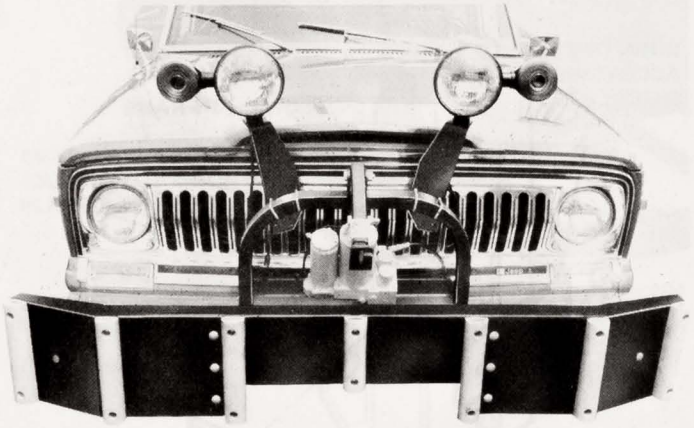
(7) Following same procedure, install long inner plates and long rubber guards.

(8) Position bumper on mounting angles, aligning holes and securing loosely with 1/2-inch diameter by 1-1/4-inch long carriage bolts, flat washers, and locknuts (fig. 3-9).

(9) Attach bumper braces to bumper with 1/2-inch diameter by 1-1/4-inch long carriage bolts, flat washers, and locknuts.

(10) Attach bumper braces to vehicle frame rails by using original bolts and nuts in holes used for original bumper brackets.

(11) Tighten all attaching hardware.



J50210

Fig. 3-9 Push Bumper Installed—Cherokee-Wagoneer-Truck with Snow Plow

REAR STEP BUMPER INSTALLATION

CJ Models

(1) Check kit to determine if all components are included (fig. 3-10).

(2) Break tack welds used to secure brackets inside bumper section during shipping.

(3) Position mounting brackets temporarily so slotted holes align with proper holes in vehicle frame.

(4) Remove brackets and ream frame holes with a 9/16-inch drill bit.

(5) Position and secure brackets to frame with holes, flat washers, lockwashers, and nuts. Install nut finger-tight.

(6) Attach step bumper to mounting brackets with bolts, lockwashers, and nuts. Install nuts finger-tight.

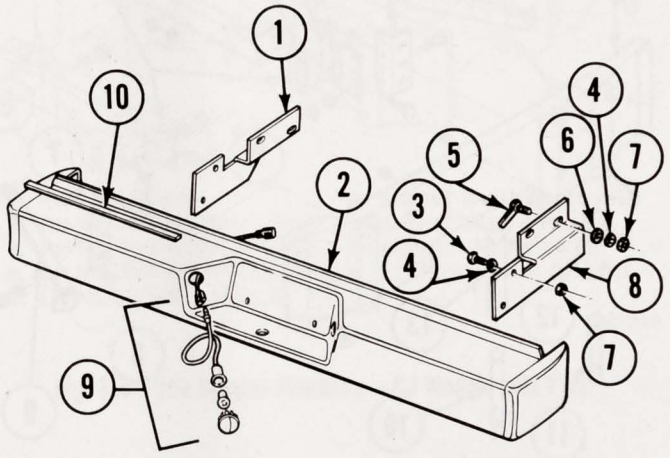
(7) Level bumper and check clearance at both ends. Adjust clearance, if necessary, and tighten bolts to 28 foot-pounds torque.

(8) Snap license plate lamp assemblies into position on bumper and connect wires to coupler.

(9) Connect coupler to vehicle wiring outlet.

(10) Round both ends of step bumper safety strips and remove protective backing. Apply safety strips to bumper surface (fig. 3-11). Using roller or hard object, start at one end and press strip tightly against metal surface.

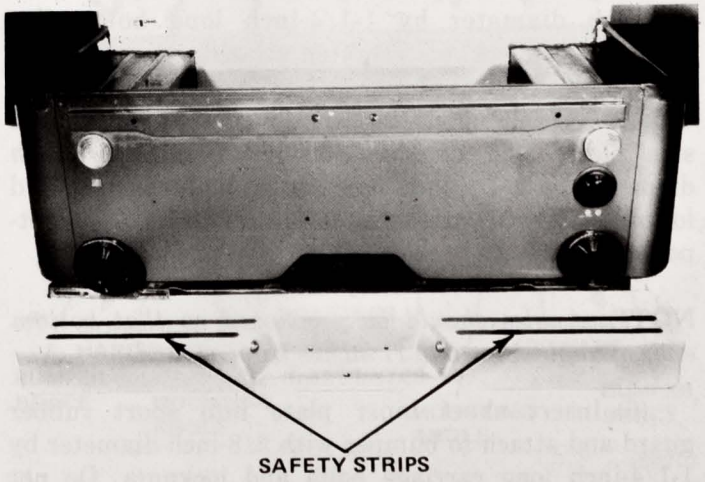
NOTE: *Temperature must be above 50°F for proper adhesion.*



1. LH MOUNTING BRACKET
2. STEP BUMPER
3. HEX HEAD BOLT
4. LOCKWASHER
5. HEX HEAD BOLT W/WING
6. FLAT WASHER
7. HEX NUT
8. RH MOUNTING BRACKET
9. LICENSE PLATE LAMP
10. SAFETY STRIP

J50211

Fig. 3-10 Rear Step Bumper Kit Components—CJ Models



J50212

Fig. 3-11 Rear Step Bumper Installed

Truck Models

(1) Check kit to determine if all components are included (fig. 3-12).

(2) Lower tailpipe by installing tailpipe relocator bracket between tailpipe hanger bracket and vehicle frame. Secure bracket with bolts, flat washers, lockwashers, and nuts.

(3) With bumper ends pointing up, attach mounting brackets to bumper with bolts, lockwashers, and nuts and tighten to 60 to 70 foot-pounds torque.

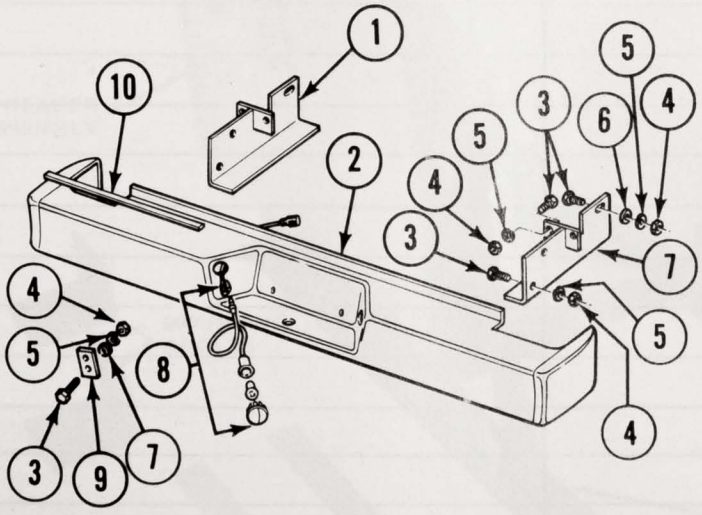
(4) Position bumper assembly so holes in mounting brackets align with holes in vehicle frame. Attach assembly to frame with bolts, lockwashers, nuts, and flat washers for slotted holes. Do not tighten nuts.

(5) Position bumper so that clearance between bumper and truck is approximately 1/2 inch. Level bumper at both ends and then tighten nuts to 28 foot-pounds torque.

(6) Snap license plate lamp assemblies into position on bumper and connect wires to coupler.

(7) Connect coupler to vehicle wiring outlet (fig. 3-13).

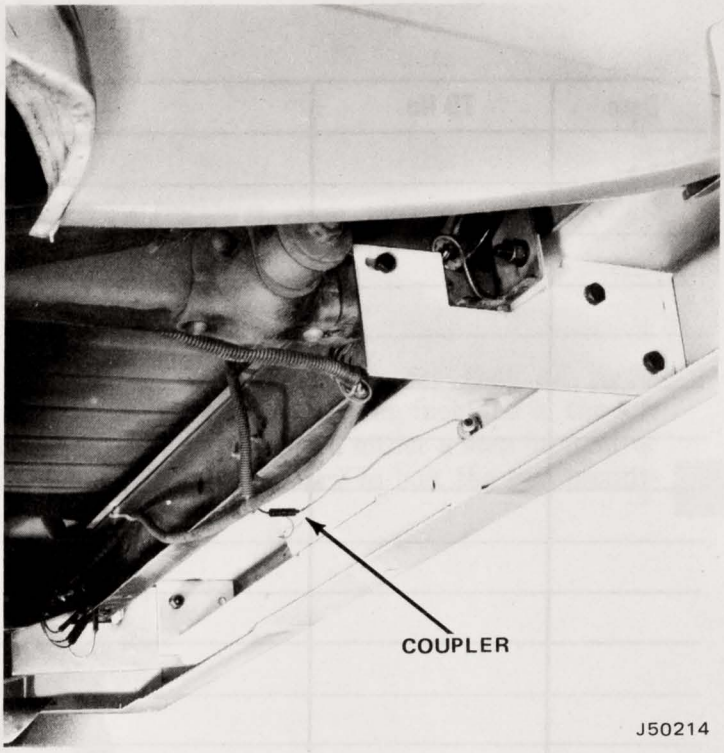
(8) Round both ends of strips and remove protective backing.



1. LH MOUNTING BRACKET
2. STEP BUMPER
3. HEX HEAD BOLT
4. HEX NUT
5. LOCKWASHER
6. FLAT WASHER
7. RH MOUNTING BRACKET
8. LICENSE PLATE LAMP
9. TAILPIPE RELOCATOR BRACKET
10. SAFETY STRIP

J50213

Fig. 3-12 Rear Step Bumper Kit Components—Truck Models



J50214

Fig. 3-13 Rear Step Bumper—Underside View

(9) Apply two safety strips on each side of bumper (fig. 3-14). Using roller, start at one end of strip and press strip tightly against metal surface.

NOTE: *For proper adhesion, apply safety strips to bumper surface when temperature is above 50°F.*

J50215

Fig. 3-14 Rear Step Bumper Installed

TECHNICAL BULLETIN REFERENCE

Date	TB No.	Subject	Changes Information on Page No.

MINI-SPREADER

GENERAL

Mini-Spreader components and hardware items necessary for installation are shown in figure 4-1.

Before starting work, check to see that all items required for installation have been included in the kit. If vehicle is not equipped with either a step bumper or draw bar, it will be necessary to bolt the two mount-

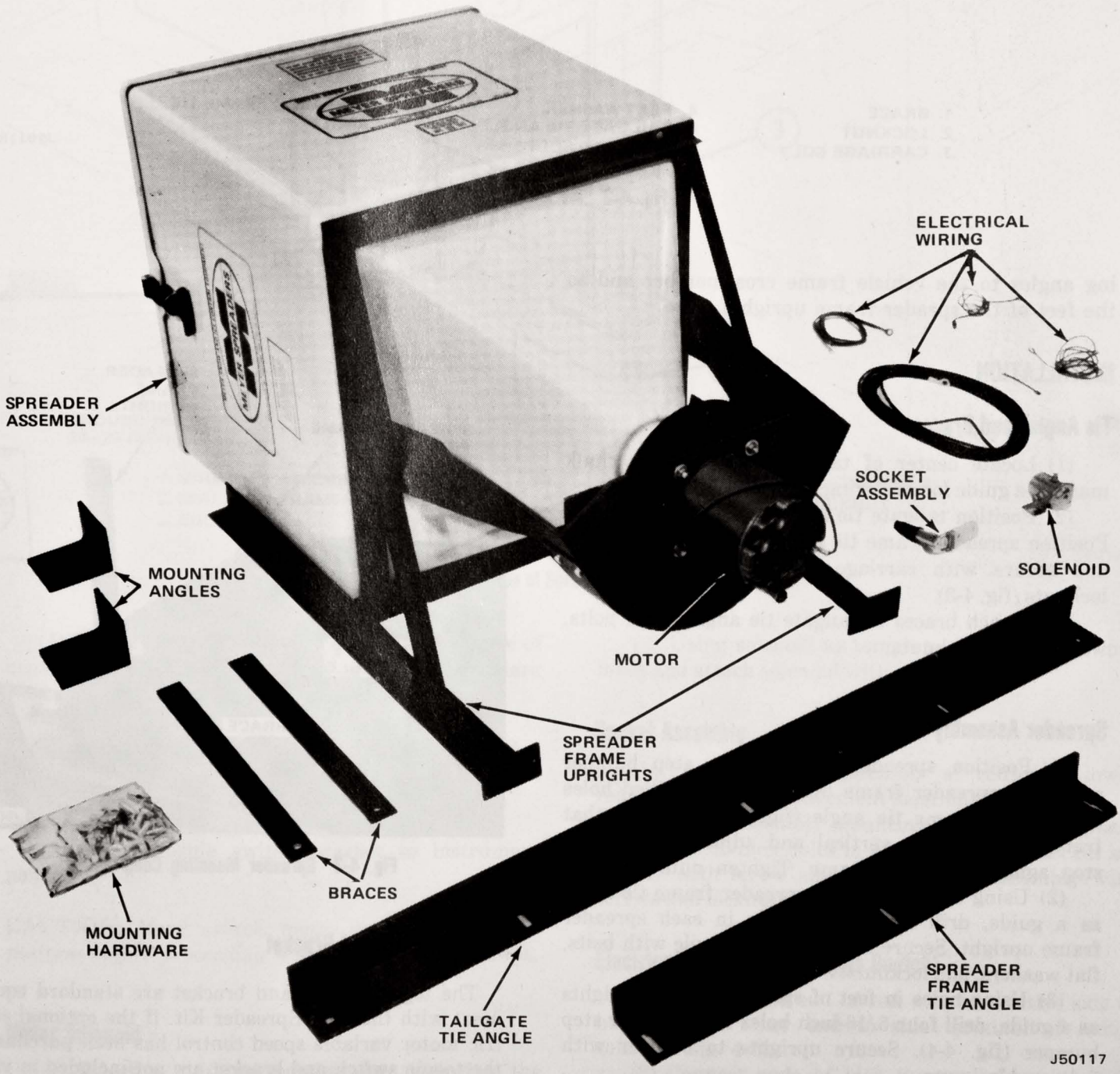
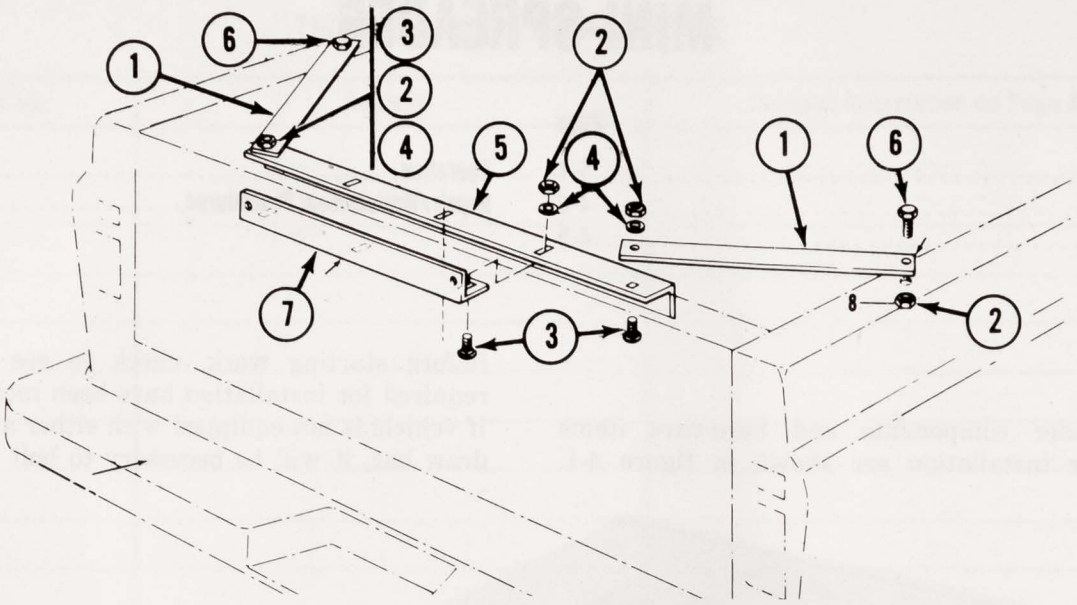


Fig. 4-1 Spreader Assembly and Hardware



1. BRACE
2. LOCKNUT
3. CARRIAGE BOLT
4. FLAT WASHER
5. TAILGATE TIE ANGLE
6. HEX HEAD BOLT
7. SPREADER FRAME TIE ANGLE

J50118

Fig. 4-2 Tie Angles and Braces

ing angles to the vehicle frame crossmember and to the feet of the speader frame uprights.

INSTALLATION

Tie Angles and Braces

(1) Locate center of tailgate and scribe a chalk mark as a guide for centering spreader.

(2) Position tailgate tie angle on tailgate (fig. 4-2). Position spreader frame tie angle on tailgate tie angle and secure with carriage bolts, flat washers, and locknuts (fig. 4-3).

(3) Attach braces to tailgate tie angles with bolts, washers, and locknuts.

Spreader Assembly

(1) Position spreader assembly on step bumper and align spreader frame uprights with drilled holes in spreader frame tie angle (fig. 4-4). Be sure that frame uprights are vertical and adjust tie angle to stop against spreader frame. Tighten nuts securely.

(2) Using drilled holes in spreader frame tie angle as a guide, drill a 7/16-inch hole in each spreader frame upright. Secure uprights to tie angle with bolts, flat washers, and locknuts.

(3) Using holes in feet of spreader frame uprights as a guide, drill four 5/16-inch holes through rear step bumper (fig. 4-4). Secure uprights to bumper with bolts and locknuts.

(4) Tighten all nuts and bolts.

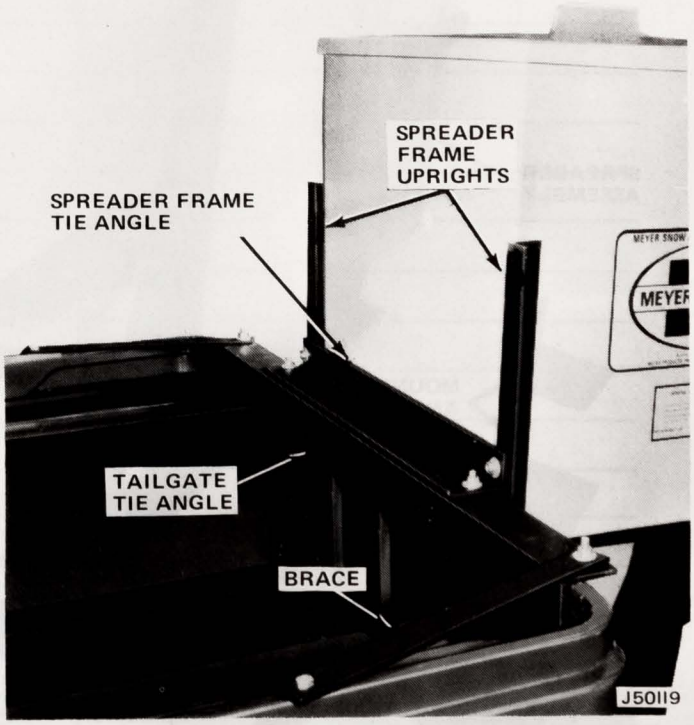


Fig. 4-3 Spreader Mounting Components

Toggle Switch and Bracket

The toggle switch and bracket are standard equipment with the Mini-Spreader Kit. If the optional electric motor variable speed control has been purchased, the toggle switch and bracket are not included in your kit. Proceed then to installation of the Motor Solenoid.

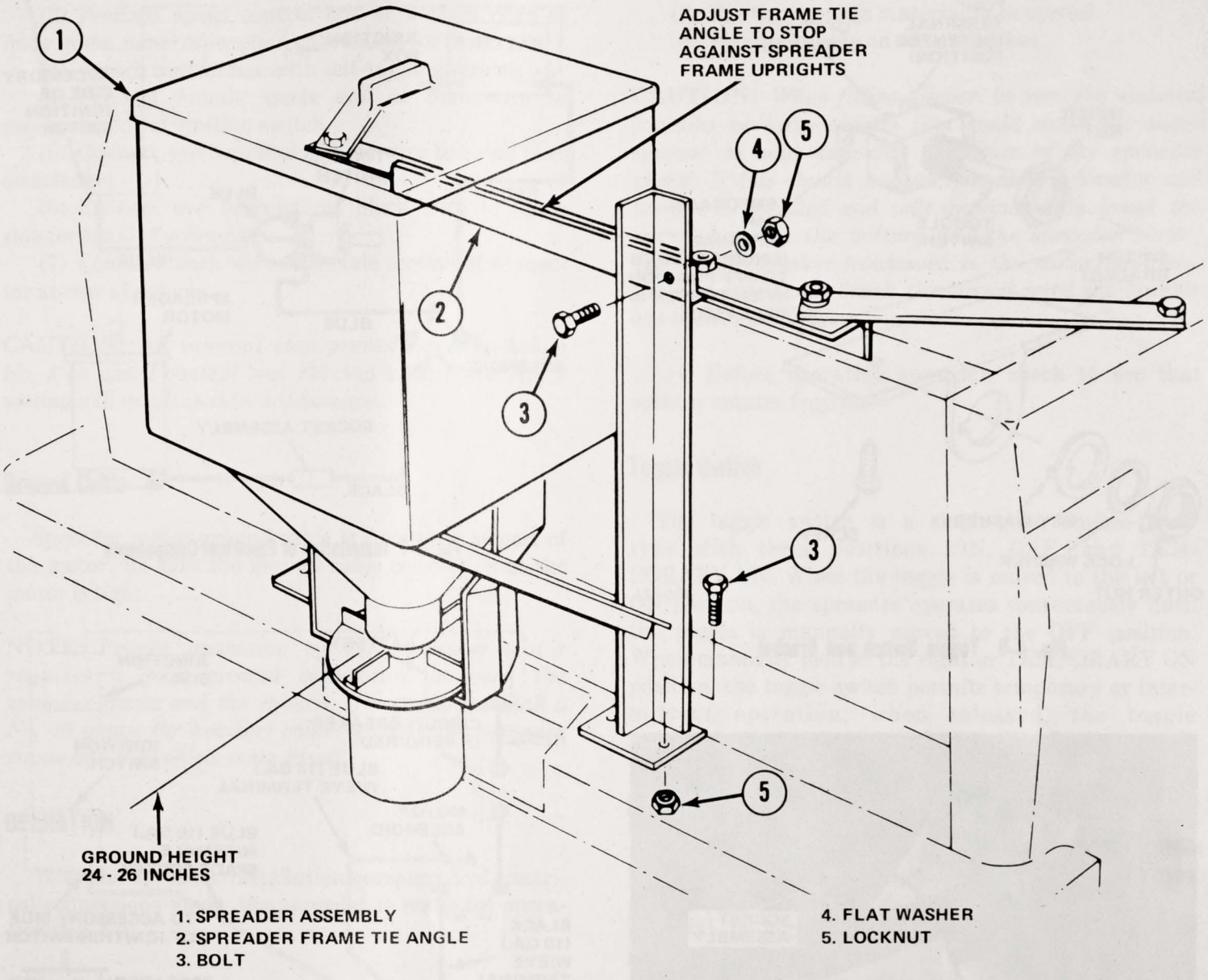


Fig. 4-4 Installation of Spreader and Spreader Frame

(1) Locate toggle switch bracket at bottom edge of instrument panel. Using bracket as a template, mark two hole locations.

NOTE: *The toggle switch should be located within easy reach of the operator, but positioned so that it cannot be accidentially actuated.*

(2) Secure toggle switch bracket to instrument panel (fig. 4-5).

CAUTION: *Move switch toggle to OFF or center position before proceeding with electrical installation.*

Motor Solenoid

(1) Select a suitable location for mounting the motor solenoid in the engine compartment.

(2) Using solenoid as template, drill two 3/16-inch holes and attach solenoid with screws.

Socket Assembly

(1) Position socket assembly at center of lower rear panel or other convenient location (fig. 4-6).

(2) Using assembly mounting bracket as template, drill two 5/32-inch holes in panel and attach socket assembly with screw and attach socket assembly with screws and locknuts.

Electrical Wiring (with Toggle Switch)

(1) Connect one end of red wire to positive side of battery, and other end to side terminal of motor solenoid (fig. 4-7).

(2) Connect ends of blue jumper wire to outside terminals of toggle switch.

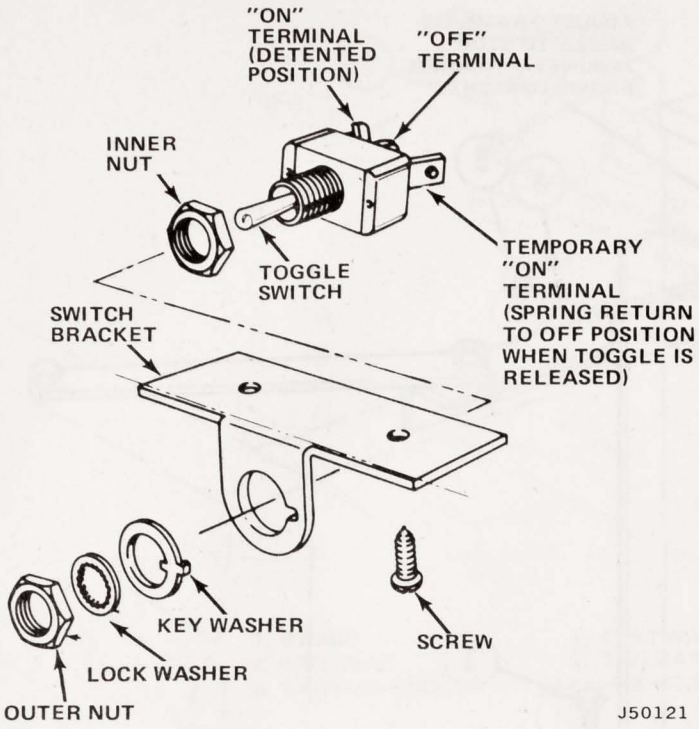


Fig. 4-5 Toggle Switch and Bracket

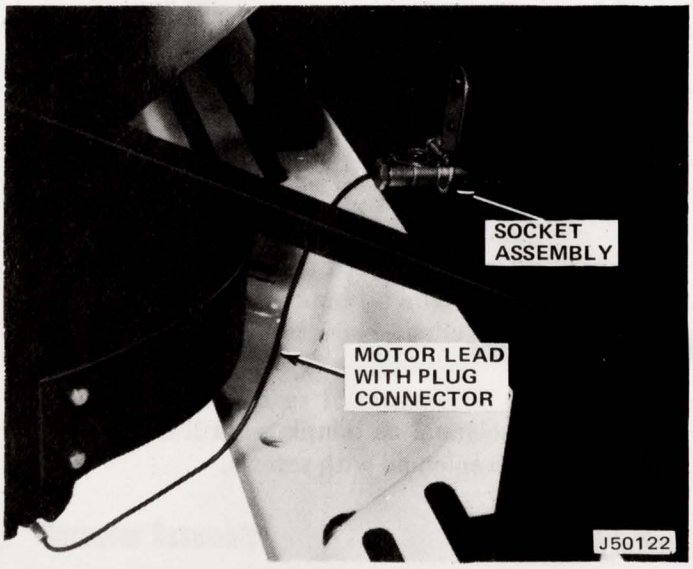


Fig. 4-6 Socket Assembly Installed

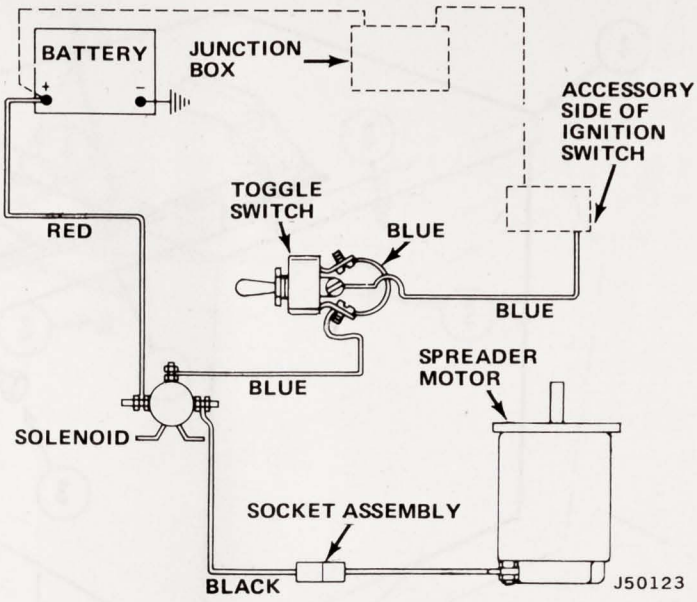


Fig. 4-7 Installation of Electrical Components

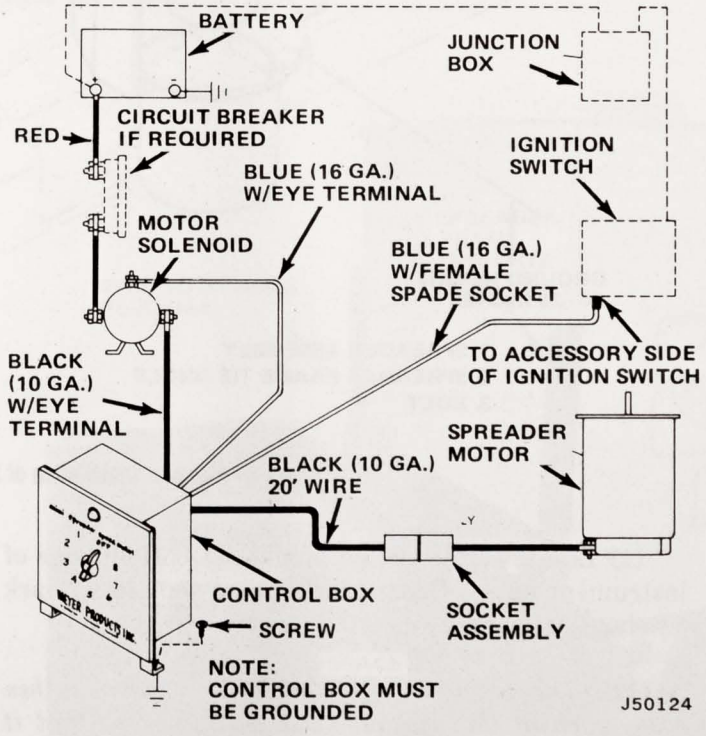


Fig. 4-8 Electric Motor Variable Speed Control Box Wiring Diagram

(3) Connect small terminal end of blue wire to center terminal of toggle switch. Connect other end to accessory side of ignition switch.

(4) Connect small terminal end of blue wire to either outside terminal of toggle switch. Connect other end to small terminal on motor solenoid.

(5) Connect terminal end of black wire to other side terminal of motor solenoid. Connect opposite end of wire to socket assembly and secure with setscrew furnished with socket.

NOTE: *Steps (2) through (5) are not applicable with optional speed control. See Electrical Wiring—with Speed Control.*

Electrical Wiring with Variable Speed Control

(1) Connect one end of red wire to positive side of battery, and other end to side terminal of motor solenoid (fig. 4-8).

(2) Position speed control box at bottom edge of instrument panel or location convenient for driver.

(3) Attach control box with self-tapping screws.

(4) Connect female spade end of blue wire to accessory side of ignition switch.

(5) Connect eye terminal of blue wire to small post on solenoid.

(6) Connect eye terminal of black wire to other side terminal of solenoid.

(7) Connect black wire to female section of connector at rear of vehicle.

CAUTION: *An internal stop prevents setting below No. 3 on speed control box. Forcing knob below No. 3 setting will result in internal damage.*

Ground Cable

Spreader motor ground cable is furnished as part of the motor. Be sure the ground cable connection at the motor is tight.

NOTE: *Proper operation of the spreader motor requires a good ground connection between the spreader frame and the chassis. If necessary, install a No. 10 gauge (or heavier) cable between the spreader frame and the vehicle main frame.*

OPERATION

With the spreader installation complete and electrical connections made, the spreader is ready for operation (fig. 4-9).

Filling the Hopper

(1) Unlatch and remove hopper cover.

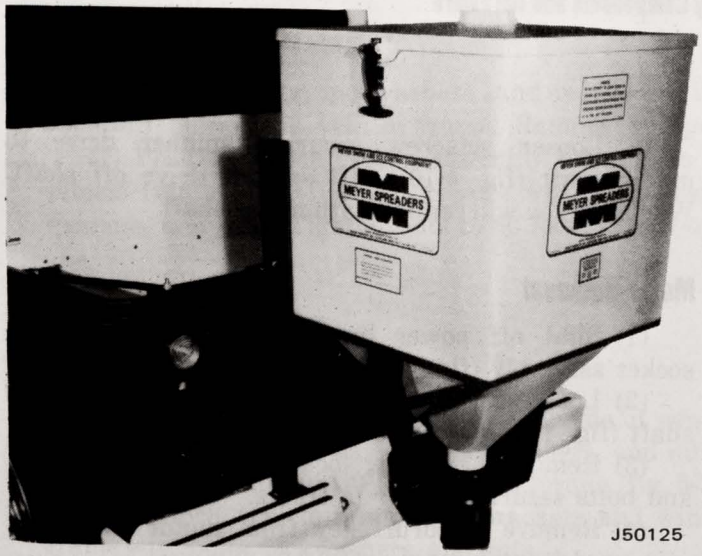


Fig. 4-9 Spreader Installed—CJ Models

(2) Fill hopper with material to be spread.

(3) Replace cover and secure latches.

CAUTION: *When filling hopper, be sure the material contains no large objects that could cause the auger spinner to bind and stop operation of the spreader motor. If this should happen, the circuit breaker will become overloaded and will automatically break the circuit between the battery and the spreader motor. The circuit breaker (contained in the motor) will continue to make and break the circuit until the trouble has been remedied.*

(4) Before operating spreader, check to see that spinner rotates freely.

Toggle Switch

The toggle switch is a single-pole, double-throw type with three positions: ON, OFF, and TEMPORARY ON. When the toggle is moved to the left or ON position, the spreader operates continuously until the toggle is manually moved to the OFF position. When manually held in the right or TEMPORARY ON position, the toggle switch permits temporary or intermittent operation; when released, the toggle automatically returns to the OFF position.

MAINTENANCE

(1) Periodically inspect for loose bolts and nuts, broken wires, and frayed or cracked wire insulation.

(2) Do not use a pick or sharp object to loosen material in hopper. Hopper is constructed of fiber glass.

(3) Empty hopper after each use and flush clean with hose. Material should be kept dry and free of lumps.

REPAIR/REPLACEMENT PROCEDURES

Auger Removal

(1) Shut off power by disconnecting plug from socket assembly (fig. 4-7 and 4-8).

(2) Remove hopper cover (fig. 4-10).

(3) From inside hopper, remove bolts and locknuts securing auger to spinner plate.

(4) Remove auger from inside hopper.

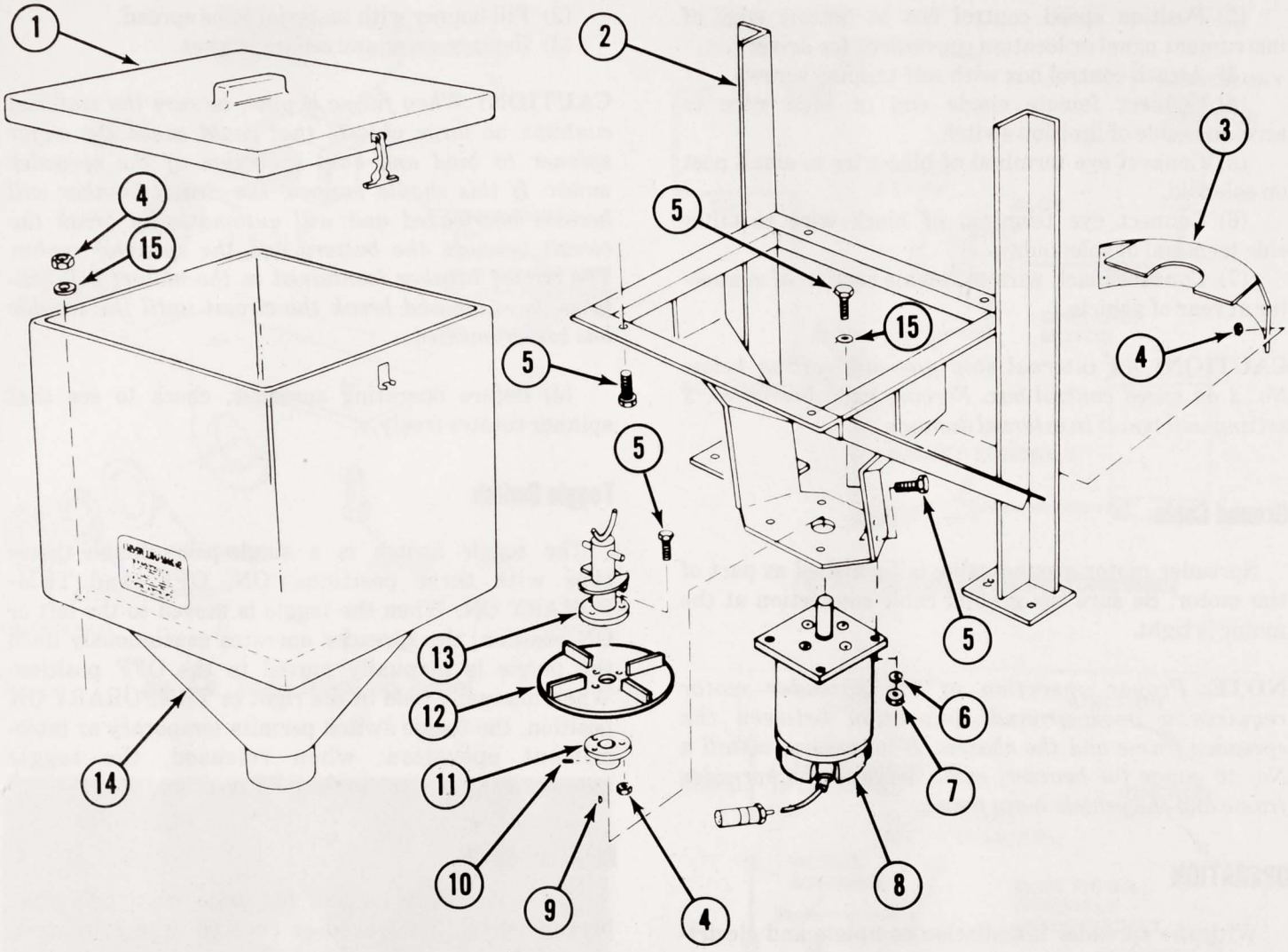
Hopper Removal

(1) Shut off power by disconnecting plug from socket assembly (fig. 4-7 and 4-8).

(2) Remove hopper cover (fig. 4-10).

(3) From inside hopper, remove locknuts, flat washers, and bolts securing hopper to frame.

(4) Remove hopper.



1. HOPPER COVER
2. FRAME
3. SPINNER BAND
4. LOCKNUT
5. BOLT
6. LOCKWASHER
7. HEX NUT
8. MOTOR
9. WOODRUFF KEY
10. SETSCREW
11. SPINNER DRIVE
12. SPINNER PLATE
13. AUGER
14. HOPPER
15. FLATWASHER

J50126

Fig. 4-10 Mini-Spreader Assembly Components and Hardware

Spinner Band Weldment Removal

(1) Shut off power by disconnecting plug from socket assembly (fig. 4-7 and 4-8).

(2) Remove locknuts and bolts securing spinner band to frame (fig. 4-10).

(3) Remove spinner band.

Spinner Plate Drive Removal

(1) Shut off power by disconnecting plug from socket assembly (fig. 4-7 and 4-8).

(2) Remove locknuts and bolts securing spinner plate to auger (fig. 4-10). Slide spinner plate out.

(3) Loosen setscrew securing spinner drive to motor shaft (fig. 4-10). Lift spinner drive off shaft. Woodruff key will remain with motor shaft.

Motor Removal

(1) Shut off power by disconnecting plug from socket assembly (fig. 4-7 and 4-8).

(2) Loosen setscrew holding spinner drive to motor shaft (fig. 4-10).

(3) Remove hex nuts, lockwashers, flat washers, and bolts securing motor to frame.

(4) Remove woodruff key from motor shaft and spinner drive.

(5) Remove motor.

WINCHES

RAMSEY ELECTRIC WINCH KIT—CJ MODELS

GENERAL

Ramsey winch kit installations on CJ models make use of the original vehicle bumper. No special equipment bumper is required. Before beginning installation, check kit contents to be sure all components are included (fig. 5-1 and 5-2). Figure 5-3 is an exploded view of the installation and includes the standard vehicle bumper.

INSTALLATION

Winch Frame

(1) Remove nuts, lockwashers, and bolts securing standard bumper to vehicle frame. Remove bumper.

(2) Position winch frame assembly on outside of vehicle frame rails (fig. 5-4). Secure with bolts, lockwashers, and nuts. Tighten nuts to 50 foot-pounds torque.

Bumper

(1) Attach two bumper brackets to inside of winch frame with bolts, flat washers, lockwashers, and nuts.

(2) Tighten nuts to 40 foot-pounds torque (fig. 5-3).

(3) Attach vehicle bumper to brackets and winch frame with bolts, lockwashers, and nuts.

(4) Tighten nuts to 18 foot-pounds torque.

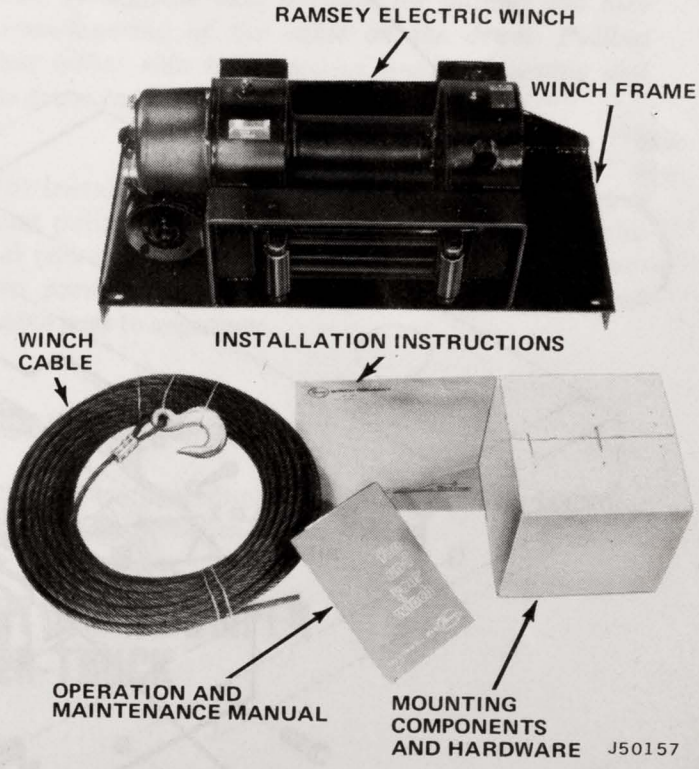


Fig. 5-1 Ramsey Electric Winch Kit Components and Hardware

Relocating Parking Lamps

(1) Remove headlamp assemblies to gain access to parking lamp wires and wiring harness.

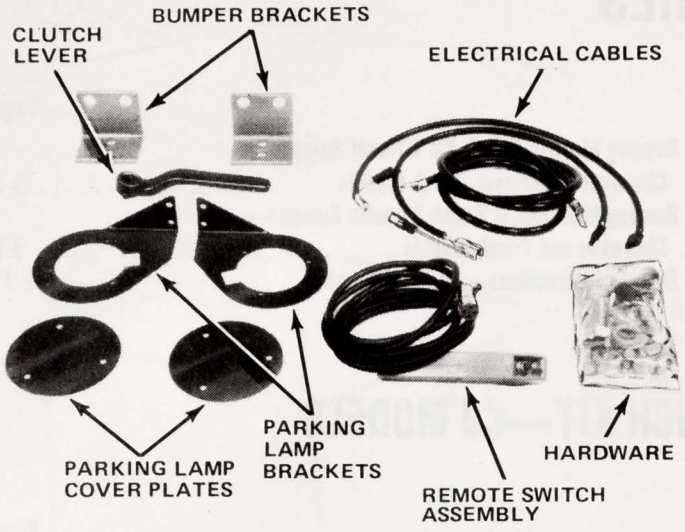


Fig. 5-2 Ramsey Electric Winch Kit Mounting Components

(2) Disconnect and remove parking lamps.

(3) Install wire extensions to both lamps.

(4) Route extensions down each side of radiator and out at lower corners of grille.

(5) Install headlamp assemblies and install parking lamp cover plates.

(6) Attach parking lamps to brackets, connect extensions, and mount assemblies to winch assembly (fig. 5-4 and 5-5).

Battery Cable and Remote Switch

(1) Connect battery cable at winch.

(2) Route cable between grille and vehicle crossmember up to positive post on battery.

(3) Plug remote switch into receptacle.

Winch Cable

(1) Unwind cable by rolling it along floor.

(2) Place end of cable, opposite hook, through fairlead rollers and into hole in winch drum.

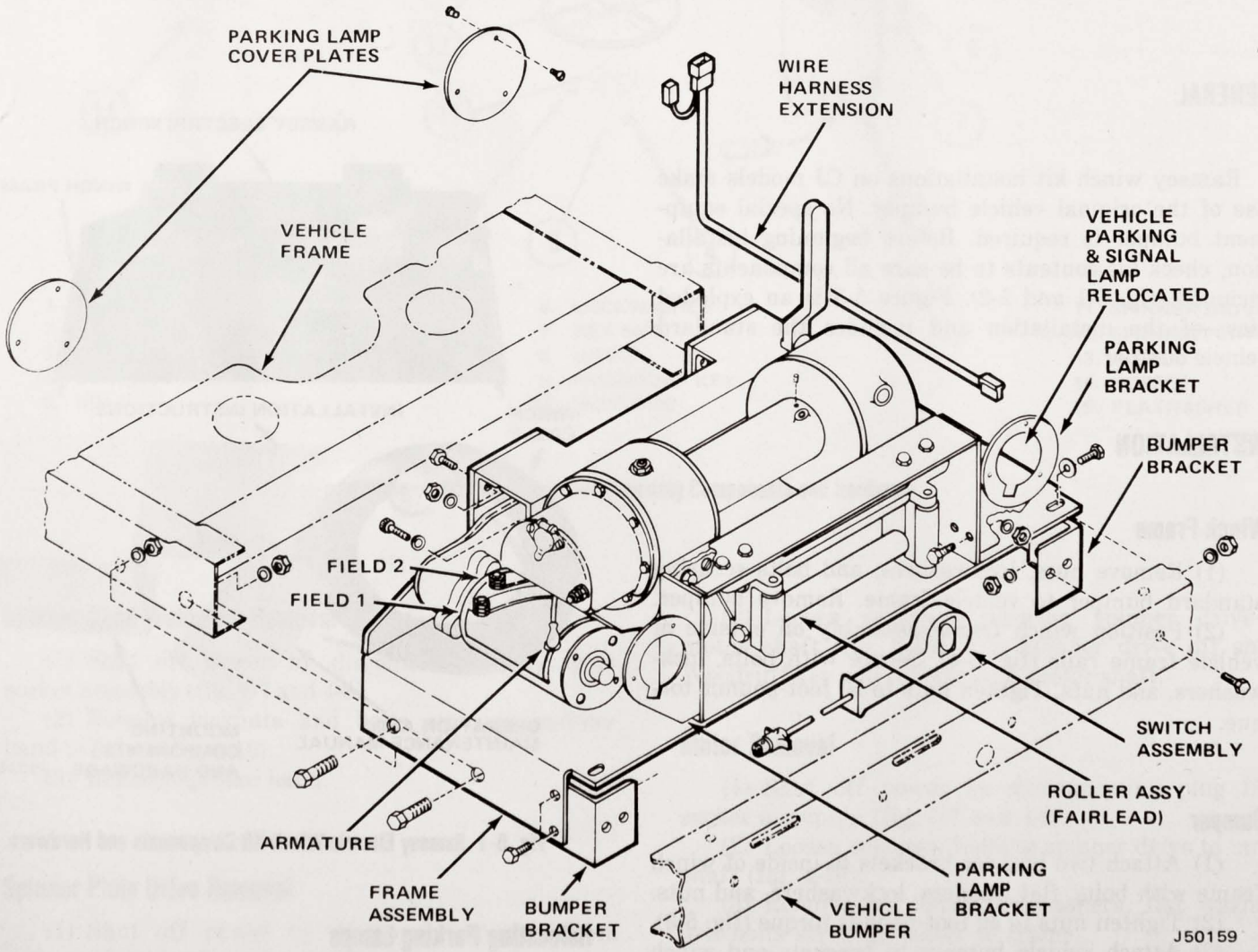


Fig. 5-3 Ramsey Electric Winch Kit Installation—CJ Models

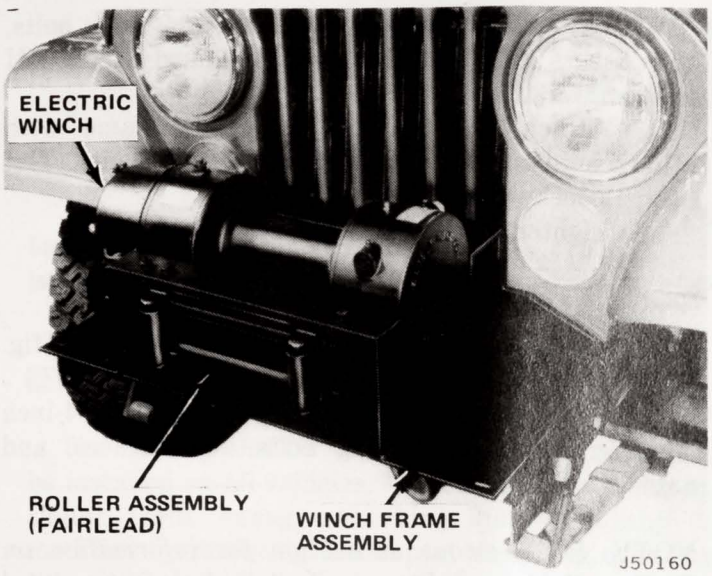


Fig. 5-4 Ramsey Electric Winch and Frame Assembly Installed

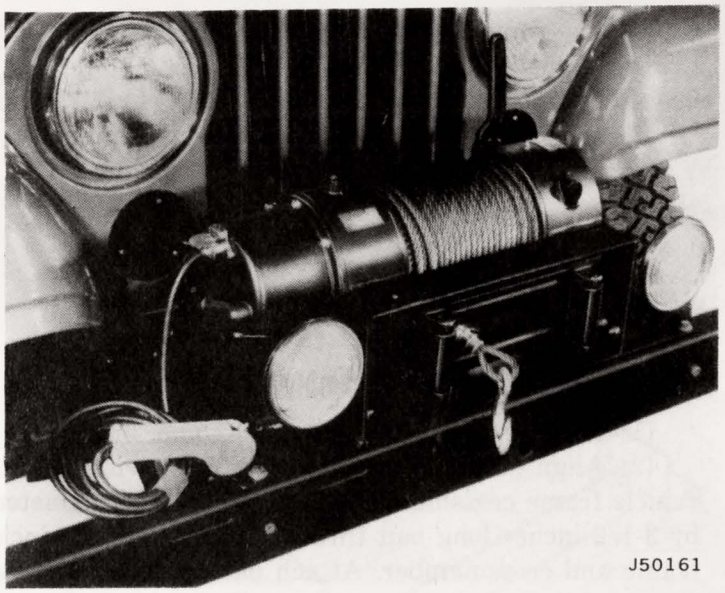


Fig. 5-5 Parking Lamps Relocated

(3) Secure cable with setscrew.

(4) Wind cable, using winch power, onto drum in even layers (refer to Operating Instructions).

LUBRICATION

The winch worm gear housing should be kept filled to the level of the side plug with SAE 140 multipurpose gear oil. Drain the gear housing once a year, flush with kerosene, and fill with new gear oil.

The spur gear (small) housing should be kept filled to the level of the plug in the side cover with SAE 20 oil. Add a few drops of SAE 20 oil to the oil cups of the motor bearings, and grease fittings at least twice a year.

OPERATING INSTRUCTIONS

(1) To spool winch cable on and off drum, operate thumb-switch in control switch handle.

(2) Use drum clutch only for free-spooling cable off drum. Do not engage or disengage clutch when power is being transmitted to winch.

(3) Before putting winch into service, perform three or four winching operations under light loads to seat worm gear to wormshaft and break-in components.

(4) Be sure load is directly in front of winch.

NOTE: *This is the best position for pulling and also for even-layering of the cable on the drum. Pulling against either side roller causes uneven layering and limits drum capacity.*

(5) Install heavy-duty battery in vehicle for heavy or long pulls. Add second battery to system for additional power if desired. Be sure batteries are connected in parallel; that is, positive post to positive and negative post to negative.

SERVICE INSTRUCTIONS

For service procedures, refer to Service Instructions—Ramsey Winches in this section.

RAMSEY ELECTRIC WINCH KIT WITH BUMPER CHEROKEE-WAGONEER-TRUCK

GENERAL

The Ramsey electric winch kit with special equipment bumper may be installed on all Cherokee, Wagoneer, and Truck models. Jeep vehicles equipped with optional front energy-absorbing bumpers may be

modified by removing the impact-absorbing cylinders. However, the impact cylinders must be installed on the vehicle when the winch is removed.

Before beginning installation, check kit contents to be sure all necessary components are included (fig. 5-6).

INSTALLATION

Winch Frame and Bumper Assembly

(1) Remove vehicle bumper and bumper braces.

(2) Align holes at rear of winch frame with hole in vehicle frame crossmember. Install 7/16-inch diameter by 3-1/2 inches long bolt through center hole of winch frame and crossmember. Attach backup plate, adding flat washer, lockwasher, and nut. Tighten bolt finger-tight. Install 5/8-inch diameter by 1-1/2-inch long bolts on each side of center bolt. Add flat washers, lockwashers, and nuts and tighten finger-tight.

(3) Attach RH and LH brackets to winch frame with 7/16 inch diameter by 1-3/4-inch long bolts, lockwashers, and nuts (fig. 5-7).

(4) Attach LH bracket to vehicle frame with bolts, lockwashers, and nuts removed previously from LH bumper brace.

(5) Attach RH bracket to vehicle frame with 7/16-inch diameter by 3-1/3-inch long bolts, flat washers, lockwashers, and locknuts.

(6) Tighten all bolts and nuts securely.

Splash Plate Seals

(1) Position RH and LH splash plate seals (fig. 5-6).

(2) Secure seals to splash plate with 1/4-inch diameter by 3/4-inch long bolts, lockwashers, and nuts.

NOTE: *See previous subsection for information on Battery Cable and Remote Switch, Lubrication, and Operating Instructions.*

SERVICE INSTRUCTIONS

For service instructions, refer to Service Instructions—Ramsey Winches in this section.

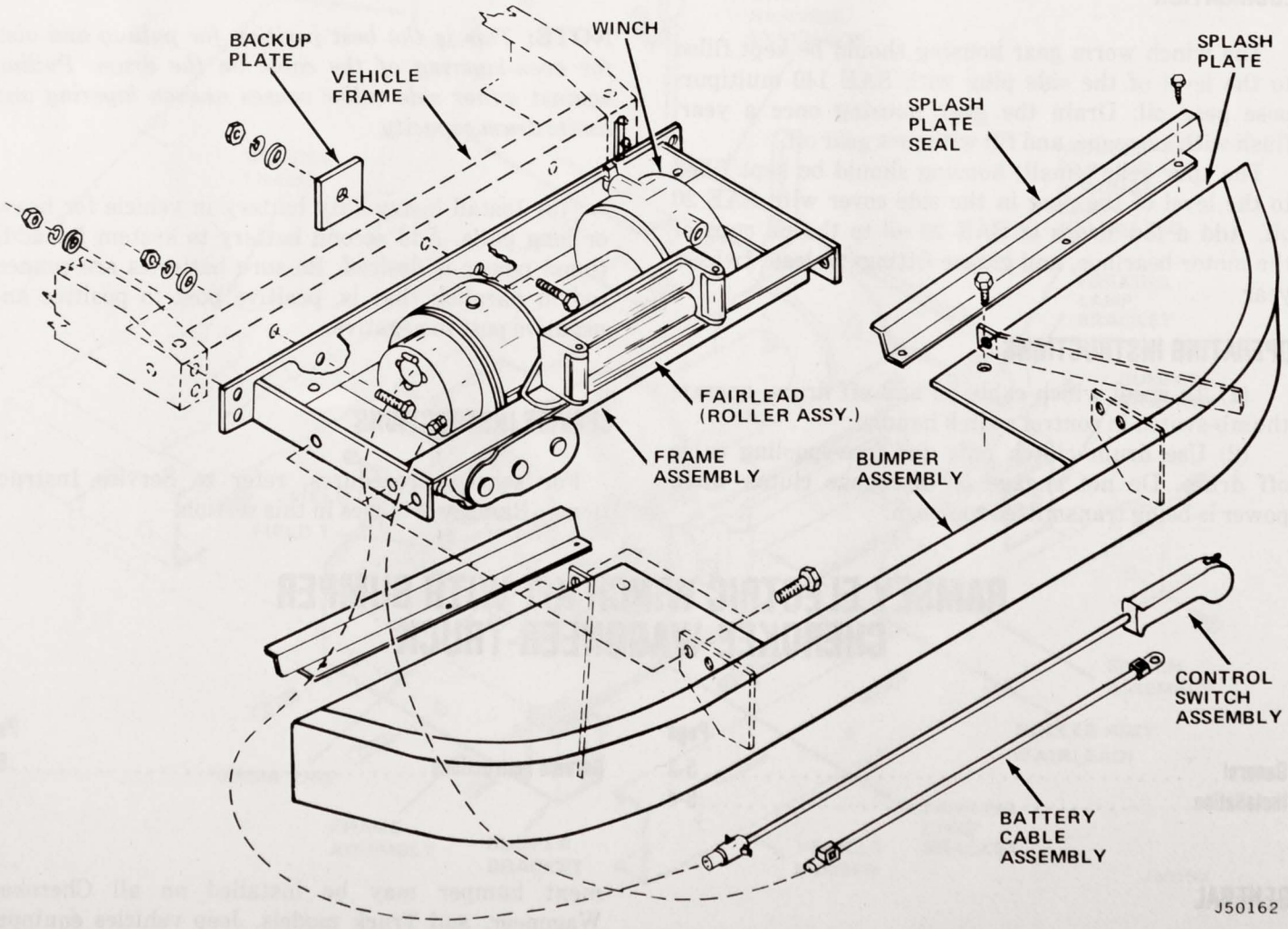


Fig. 5-6 Ramsey Electric Winch Kit Components—Cherokee-Wagoneer-Truck

RAMSEY ELECTRIC WINCH KIT WITHOUT BUMPER CHEROKEE-WAGONEER-TRUCK

GENERAL

The Ramsey electric winch kit without bumper may be installed on all vehicles. Vehicles equipped with optional front energy-absorbing bumpers may be modified by removing the impact-absorbing cylinders. When the winch is removed, the impact cylinders must be installed on the vehicle.

Before beginning installation, check to be certain kit contains all necessary components.

INSTALLATION

Winch Frame Assembly

(1) Remove vehicle bumper.

(2) Align holes at rear of winch frame with holes in vehicle frame crossmember. Install 7/16-inch diameter by 3-1/2-inch long bolt through center hole of winch frame and crossmember and attach backup plate, adding flat washer, lockwasher, and nut (fig. 5-8). Tighten bolt finger-tight. Install 5/8-inch diameter by 1-1/2-inch long bolts on each side of center bolt. Add flat washers, lockwashers, and nuts and tighten finger-tight.

(3) Attach RH and LH brackets to winch frame with 7/16 inch diameter by 1-3/4-inch long bolts, lockwashers, and nuts (fig. 5-7).

(4) Attach LH bracket to vehicle frame with bolts, lockwashers, and nuts removed previously from LH bumper brace.

(5) Attach RH bracket to vehicle frame with 7/16-inch diameter by 3-1/2-inch long bolts, flat washers, lockwashers, and locknuts.

(6) Tighten all bolts and nuts securely.

Bumper

(1) Remove bumper mounting brackets from back side of vehicle bumper (fig. 5-8). Turn brackets so as to point toward bumper mounting braces. Using bolts removed, install brackets using inside set of existing holes in center section of bumper. (This shortens the bumper approximately 2 inches.) Do not tighten bolts until after splash plates are installed.

(2) Attach splash plate brackets to bumper using original bumper brace holes and bolts. Do not tighten until after splash plates are installed.

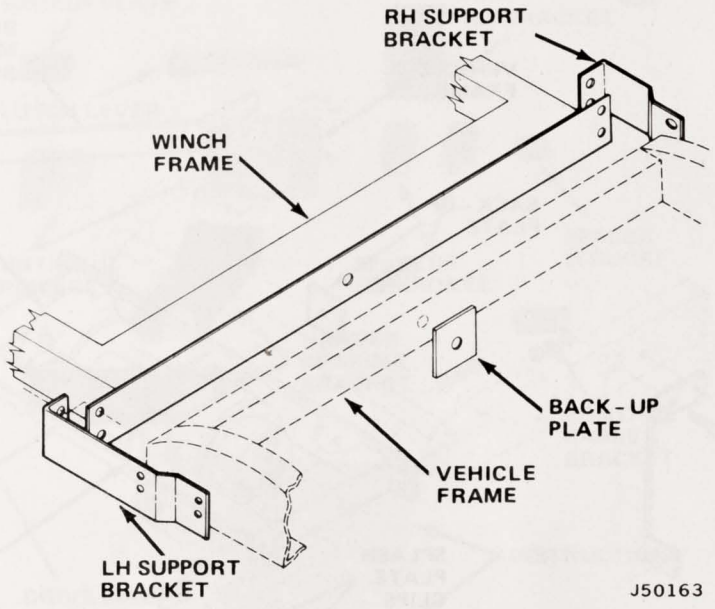


Fig. 5-7 Ramsey Electric Winch Kit Installation Cherokee-Wagoneer-Truck

(3) Install bumper by inserting 7/16-inch diameter by 2-inch long bolts through bumper mounting brackets, spacers, and winch frame. Add lockwashers and nuts, and tighten securely.

(4) Attach bumper brace supports to splash plate brackets with 3/8-inch diameter by 1-1/4-inch long bolts, lockwashers, and nuts. Install splash plate clips at same time.

(5) Attach vehicle bumper mounting braces to bumper brace supports with 3/8-inch diameter by 1-1/4-inch long bolts, lockwashers, and nuts. Tighten securely.

Splash Plates

(1) Align splash plates with holes in top of winch frame and attach with 1/4-inch diameter by 3/4-inch long bolts, lockwashers, and nuts (fig. 5-8).

(2) Attach two remaining splash plate clips to splash plate brackets with 3/8-inch diameter by 1-1/4-inch long bolts, flat washers, lockwashers, and nuts. Tighten finger-tight.

(3) Tighten bumper bolts. Level splash plates. Tighten all other bolts securely.

Splash Plate Seals

(1) Position RH and LH splash plate seals (fig. 5-8).

(2) Secure seals to splash plates with 1/4-inch diameter by 3/4-inch long bolts, lockwashers, and nuts.

NOTE: *See previous subsection for information on Battery Cable, Remote Switch, Lubrication and Operating Instructions.*

SERVICE INSTRUCTIONS

For service procedures, refer to Service Instructions—Ramsey Winches in this section.

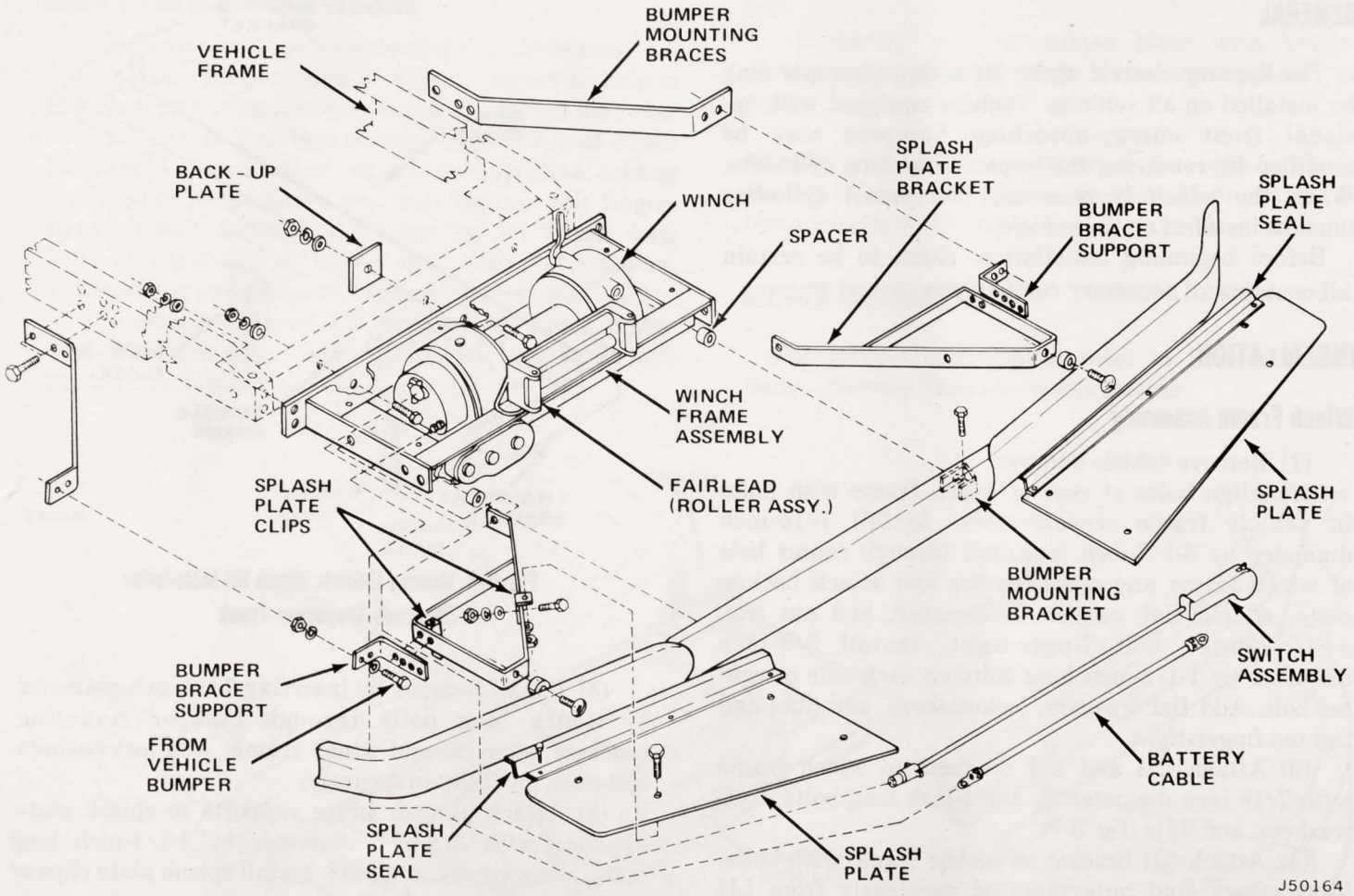


Fig. 5-8 Ramsey Electric Winch Kit Without Bumper—Cherokee-Wagoneer-Truck

RAMSEY MECHANICAL WINCH KIT WITH BUMPER CHEROKEE AND TRUCK

GENERAL

The Ramsey mechanical winch kit with special equipment bumper may be installed on all Cherokee and Truck vehicles **except those equipped with Quadra-Trac or with a stabilizer bar.** Vehicles equipped with optional front energy-absorbing bumpers may be modified by removing the impact-

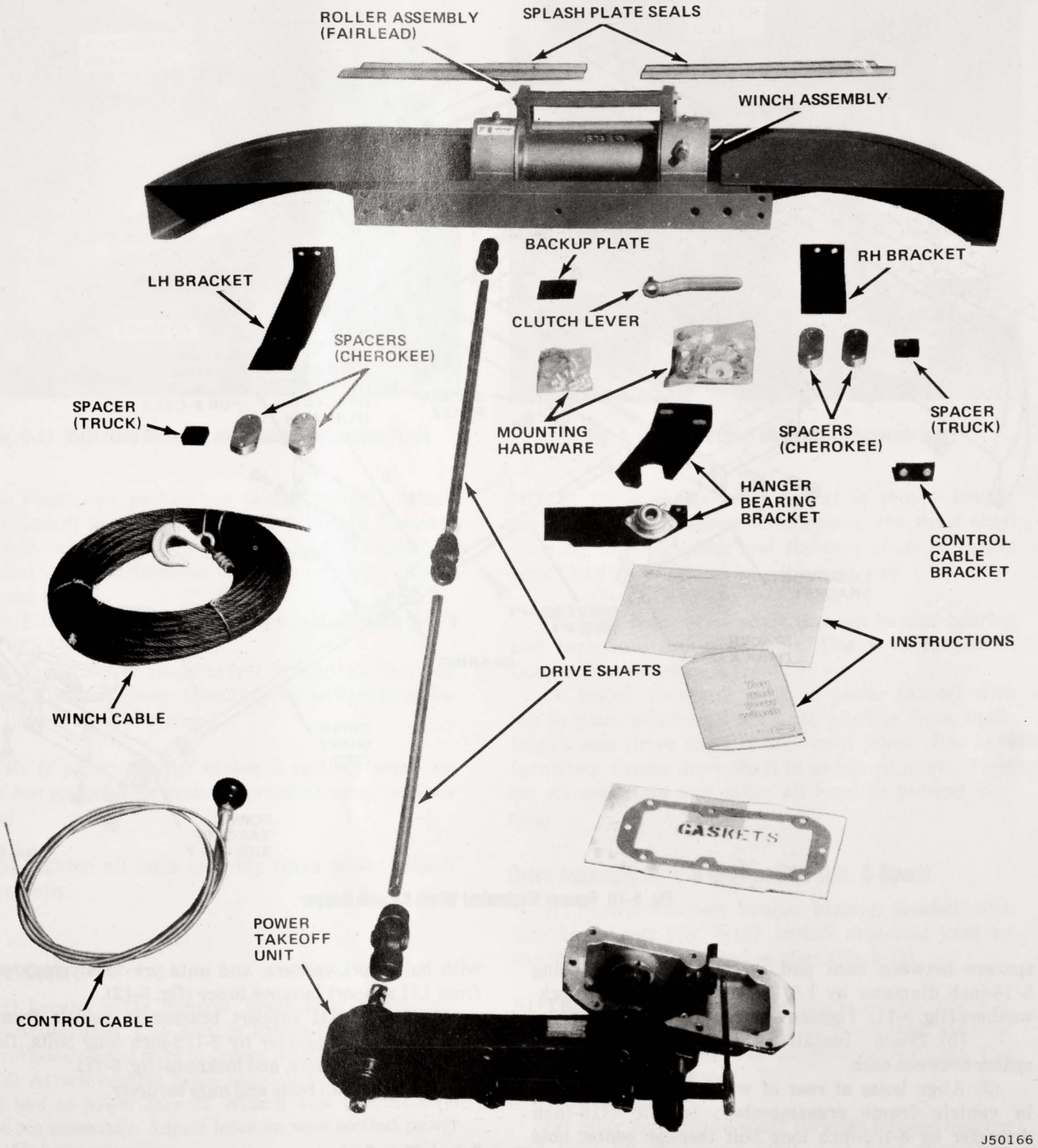


Fig. 5-9 Ramsey Mechanical Winch Kit Components

absorbing cylinders. However, the impact cylinders must be installed on the vehicle whenever the winch is removed.

Before beginning installation, check kit contents to be sure all necessary components are included (fig. 5-9 and 5-10).

INSTALLATION

Winch and Bumper Assemblies

(1) Remove vehicle bumper and bumper braces.
(2) Remove two snubber pads above front axle.
(a) *Cherokee*—Install snubber pads with

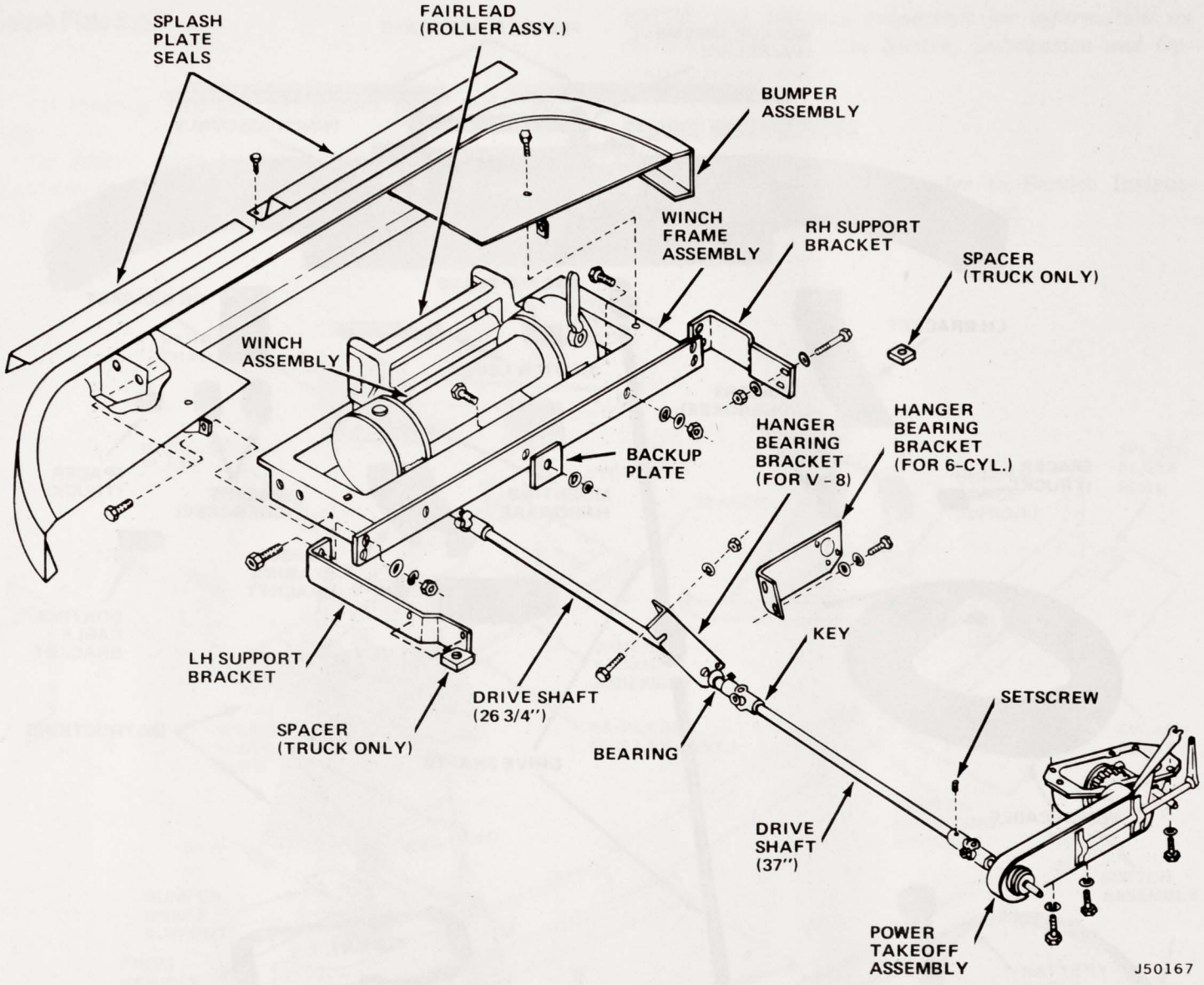


Fig. 5-10 Ramsey Mechanical Winch Kit with Bumper

spacers between each pad and vehicle frame using 5/16-inch diameter by 1-1/2-inch long bolts and lockwashers (fig. 5-11). Tighten securely.

(b) *Truck*—Install snubber pads with one spacer between each.

(3) Align holes at rear of winch frame with holes in vehicle frame crossmember. Install 7/16-inch diameter by 3-1/2-inch long bolt through center hole of winch frame and crossmember (fig. 5-12). Attach backup plate, adding a flat washer, lockwasher, and nut. Tighten bolt finger-tight. Install 5/8-inch diameter by 1-1/2-inch long bolts on each side of center bolt. Add flat washers, lockwashers, and nuts and tighten finger-tight.

(4) Attach RH support and LH support brackets to winch frame with 7/16-inch diameter by 1-3/4-inch long bolts, lockwashers, and nuts (fig. 5-10).

(5) Attach LH support bracket to vehicle frame with bolts, lockwashers, and nuts previously removed from LH support bumper brace (fig. 5-12).

(6) Attach RH support bracket to vehicle frame with 7/16-inch diameter by 3-1/2-inch long bolts, flat washers, lockwashers, and locknuts (fig. 5-11).

(7) Tighten all bolts and nuts securely.

Splash Plate Seals

(1) Position RH and LH splash plate seals (fig. 5-10).

(2) Using seals as templates, drill 5/32-inch holes in splash plate. Secure with self-tapping screws.

Power Takeoff

(1) Drain oil from transfer case and remove inspection plate.

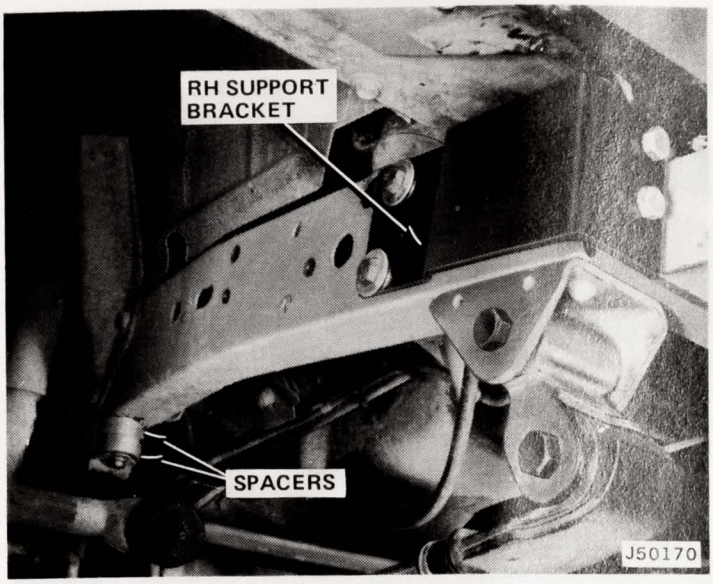


Fig. 5-11 Right Hand Mounting and Spacers—Cherokee-Truck

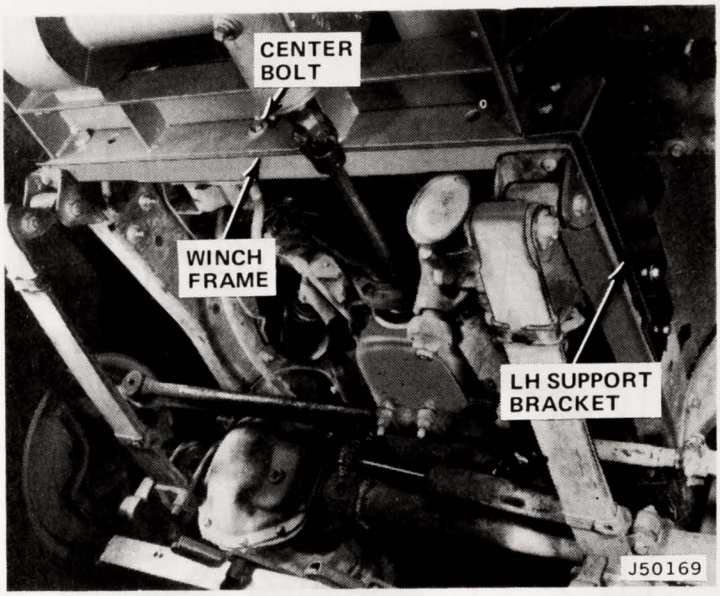


Fig. 5-12 Front and LH Mounting—Cherokee-Truck

(2) Place two gaskets on power takeoff. Attach power takeoff to transfer case with 5/16-inch diameter by 1-inch bolts, 5/16-inch diameter by 2-1/4-inch long bolt, and 5/16-inch diameter by 3-inch long bolt, all with lockwashers.

(3) Fill transfer case and power takeoff with 3-1/4 pints of SAE 90W oil.

(4) Put transfer case control in neutral. Run and manually control power takeoff (refer to Operating Instructions in this subsection).

NOTE: *If power takeoff makes a rattling noise, remove one gasket. If it makes a grinding noise, add one gasket.*

(5) Tighten all bolts securely when power takeoff runs quietly.

Control Cable

(1) Locate cable control bracket at convenient place under dash. Cut hole in firewall for cable. Cut control housing and wire to proper length.

(2) Attach control cable housing to bracket under dash and to power takeoff. Attach wire to shift level pivot pin assembly. Adjust lever on wire so that power takeoff shifts properly.

Drive Assembly for Six-Cylinder Engine, 258-CID, 3-Speed

(1) Position correct hanger bearing bracket in front support with bearing to rear (fig. 5-10). Secure with 3/8-inch diameter by 1/4-inch long bolts and lockwashers. Install universal joint on winch input shaft with key in place.

NOTE: *Drive shafts must be cut to proper length. For six-cylinder, 3-speed installations, the front shaft must be 26 inches long and the rear shaft 35 inches long. Cut drive shafts on long (keyway) end.*

(2) Slide front drive shaft through hanger bearing and back into universal joint. Use keys furnished. Long keyway must be to front.

(3) Install universal joint on power takeoff with key in place and install universal joint on front shaft. Install rear drive shaft in universal joints. Use keys furnished. Center drive shaft in universal joints. Tighten all setscrews and stake all keys to prevent slipping.

Drive Assembly for V-8 Engine, 360-CID, 3-Speed

(1) Position correct hanger bearing bracket with bearing to rear (fig. 5-10). Install universal joint on winch input shaft with key in place (fig. 5-13).

NOTE: *Front shaft must be cut to length. For V-8, 360-CID, 3-speed installations, the front shaft must be 23-1/2-inches long, the rear shaft 37 inches long. Cut shaft on long keyway end.*

(2) Slide front drive shaft through hanger bearing and back into universal joint. Use keys furnished. Long keyway must be to the front.

(3) Install universal joint on power takeoff with key in place and install universal joint on front shaft. Install rear drive shaft in universal joints. Use keys furnished. Center drive shaft in universal joints. Tighten all setscrews and stake all keys to prevent slipping.

Bearing and shaft installation is shown in figures 5-14 and 5-15. A front view of the winch and bumper installation is shown in figure 5-16.

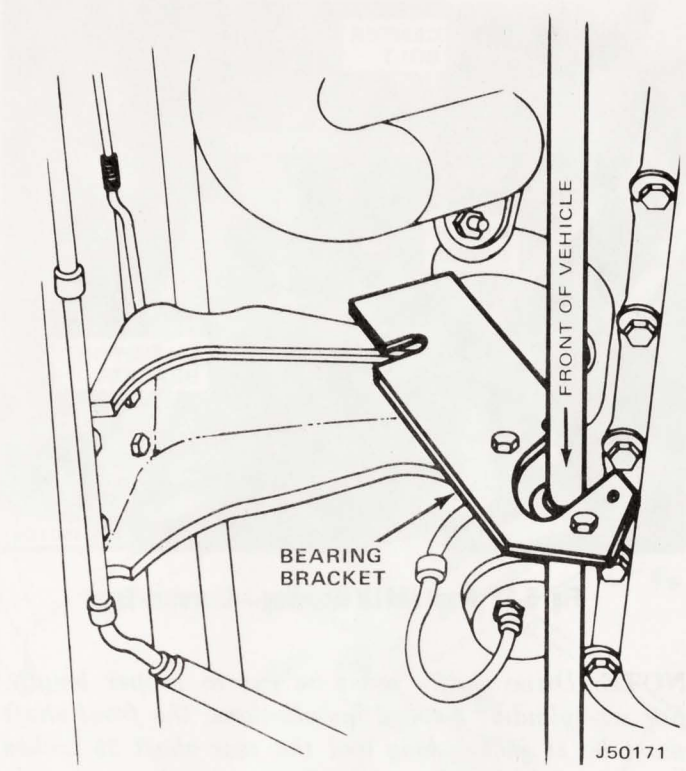


Fig. 5-13 Bearing Bracket Installation—V-8 Engine

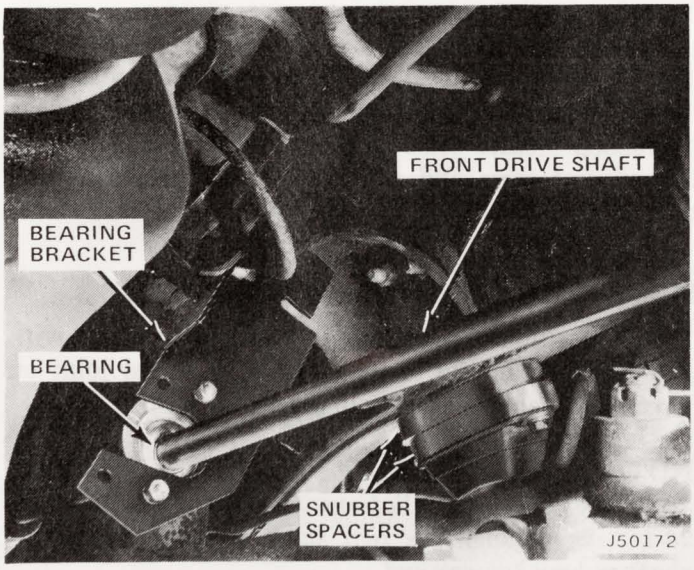


Fig. 5-14 Bearing Bracket and Spacers Installed—Cherokee V-8 Engine

Winch Cable

(1) Unwind winch cable by rolling it along floor.

(2) Place end of cable, opposite hook, through fairlead rollers and into hole in winch drum. Secure cable with setscrew.

(3) Operate winch to wind cable drum in even layers (refer to Operating Instructions in this subsection).

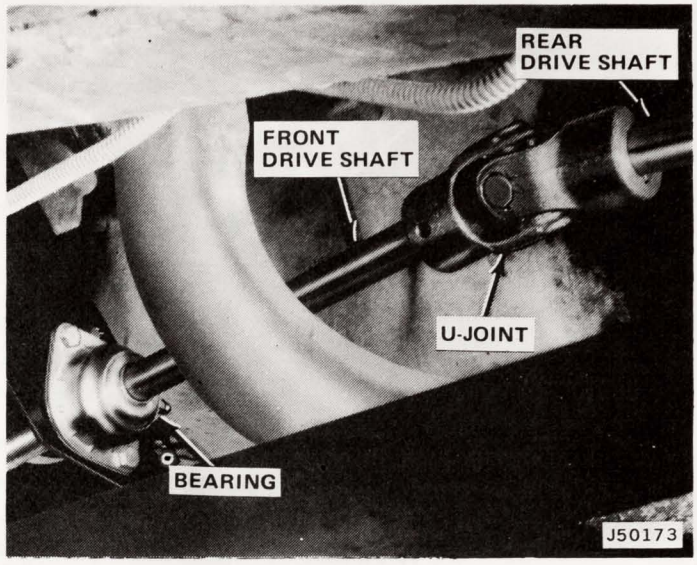


Fig. 5-15 Bearing and Shaft Installed—Cherokee V-8 Engine

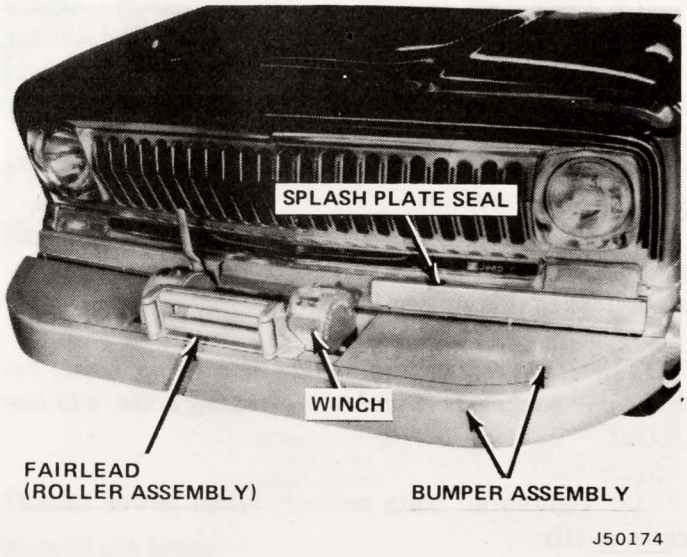


Fig. 5-16 Typical Winch Installation—Cherokee Model Shown

LUBRICATION

The worm gear housing of the winch should be kept filled to level of the side plug with SAE 140W multi-purpose gear oil. Once a year, drain the gear housing, flush with kerosene, and fill with new gear oil.

The chain case should be kept filled to the level of the rear plug with SAE 30W nondetergent oil. Drain and fill once a year.

Lubricate parts that have grease fittings at least twice a year using No. 2 lithium base grease.

Lubricate rollers by oiling at ends.

OPERATING INSTRUCTIONS

(1) Shift drum clutch to OUT position. This will

allow cable to be spooled off by hand. Secure cable to object to be pulled. Shift drum clutch to IN position. Be sure clutch is completely engaged to avoid damage to clutch.

(2) Shift transfer case level to neutral position. Start engine, disengage vehicle clutch, and shift power takeoff to IN position. Place transmission shift lever in desired gear ratio. Engage clutch to begin winching.

(3) Complete winching operation, wind cable on drum, and secure hook on bumper. Shift power takeoff to OUT position and shift clutch on winch to OUT position. This procedure prevents cable from damaging bumper if power takeoff is accidentally engaged while operating vehicle.

CAUTION: *The drum clutch is provided for free-spooling the cable off the drum. Do not engage or disengage the clutch when power is being transmitted to the winch. The load should be directly in front of the winch. This is also the best position for reeling the cable evenly onto the drum. Pulling against either side roller causes uneven buildup.*

SERVICE INSTRUCTIONS

Refer to Service Instructions—Ramsey Winches in this section.

SERVICE INSTRUCTIONS—RAMSEY WINCHES

GENERAL

The following periodic maintenance and service instructions apply to all Ramsey winches, electrical and mechanical, covered in this section.

PERIODIC MAINTENANCE

A breather plug is located at the top of the gear housing to release gases formed from the oil heating while the winch is in use. Be sure it is open. If the breather is clogged, pressure buildup in the housing can cause excessive heating and oil leakage.

Inspect winch frame mounting bolts and winch mounting bolts periodically. Keep them tight.

REMOVAL

The winch must be removed from the vehicle for servicing. Remove winch according to the following procedures.

(1) Loosen both setscrews in front universal joint of drive line. Slide universal joint toward rear of vehicle until it slides off input shaft of winch.

(2) While holding winch in place, remove all winch mounting bolts and lower winch to floor or ground.

OVERHAUL

The following overhaul procedure provides detailed instructions for replacement of winch components (fig. 5-17 and 5-18). To replace any given part, follow the disassembly procedure up to removal of that part, and continue the assembly procedure from the point at which the part is replaced.

Disassembly

As parts are removed, place them in a cleaning solution, such as naphtha. Remove all grease, oil, and foreign matter collected on the parts. After cleaning, place on clean shop rags to drain and dry.

(1) Drain oil from gear housing by removing pipe plug in bottom of housing. Use clean container to catch oil.

(2) Stand winch up on gear housing cover (fig. 5-19).

(3) Lift clutch housing and shift clutch as far down as possible by pulling shaft handle up.

(4) Raise clutch housing until jaw-type clutch is at top of keys. Tilt housing, disengage yoke from jaw clutch, and remove clutch housing.

(5) Remove setscrew from shift handle and tap handle off shifter shaft (fig. 5-20).

(6) Remove key from shaft.

(7) Remove setscrew from yoke. Use a mallet and pin punch to tap shaft until it slips out of yoke. Remove yoke and slide shaft out of housing.

(8) Remove screw being careful not to lose spring or poppet ball (fig. 5-21).

(9) Slip jaw clutch off drum shaft.

(10) Remove keys and drum spacer.

(11) Slide drum up off drum shaft.

(12) Remove poppet brake discs and springs (fig. 5-22).

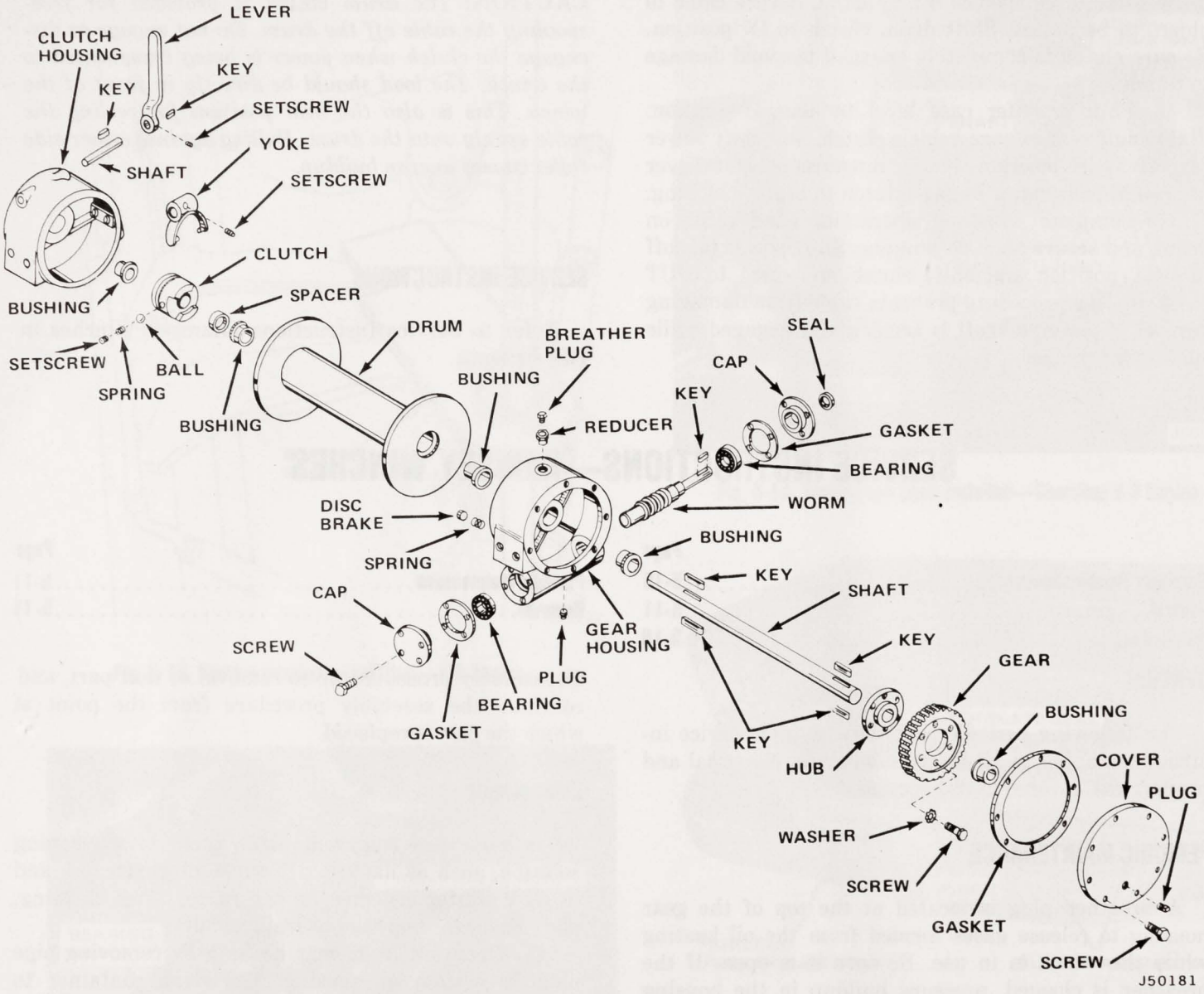


Fig. 5-17 Mechanical Winch—Exploded View

(13) Remove capscrews from both bearing caps.

(14) Remove bearing caps and gaskets from winch. Take care not to damage seal in cap. Use a seal slip on shaft.

(15) Inspect seal. Replace if damaged or leaking.

(16) Use mallet and bar of soft metal (such as brass) of smaller diameter than end of wormshaft to drive worm out of housing. Do not drive worm from input end of worm.

NOTE: *The bearing on input side of housing will come out with worm. The bearing on the opposite side will probably come apart. If this happens, outer race of bearing will have to be pressed out of housing. If bearing does not come apart, press whole bearing out of housing.*

(17) Press remaining bearing off worm (fig. 5-23). It is recommended that new bearings be installed any time worm is removed.

(18) Turn gear housing over and remove capscrews from cover (fig. 5-24).

(19) Insert two capscrews removed in tapped holes on either side of cover and screw evenly into pull cover.

(20) Slide worm gear and drum shaft out of housing.

(21) Inspect gear. Remove capscrews from gear if worn or broken and press gear off hub (fig. 5-25). Take care not to damage hub or drum shaft.

(22) Press hub from shaft if drum shaft is to be replaced.

(23) Remove keys from shaft if hub was removed.

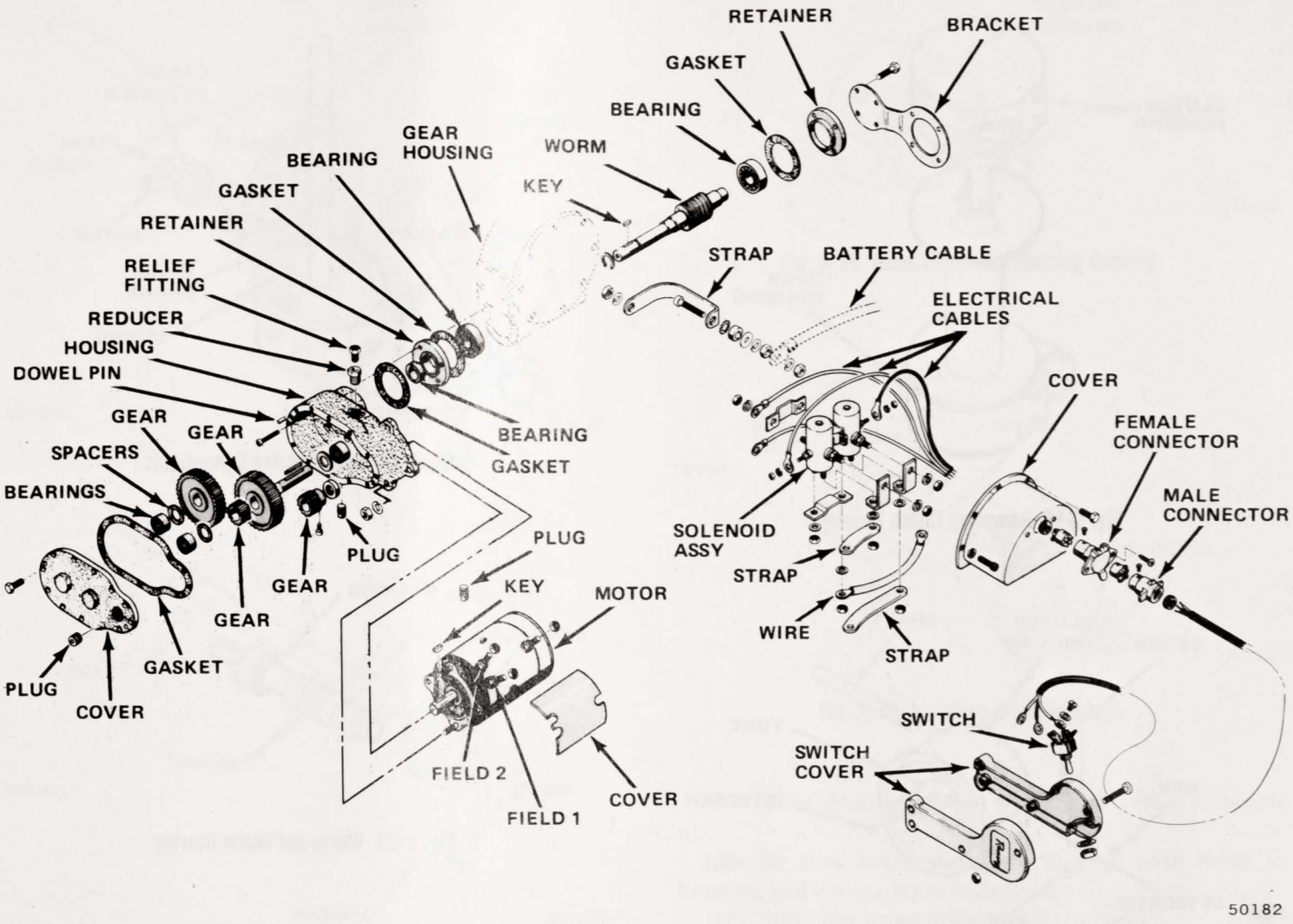


Fig. 5-18 Electrically Driven Winch—Exploded View

(24) Clamp key in vise. Tap on drum shaft. Use Vise-Grip pliers, if vise is not available, to clamp on key. Tap up on pliers to remove key. Repeat this operation to remove remaining key.

(25) Clean and inspect all parts and replace parts that are worn or damaged. Place all parts in a clean place, free from dirt and grease, until assembly.

Assembly

Steps (1) through (4) need not be used unless new bushings are to be installed.

(1) Press new bushing into cover (fig. 5-26). Be sure bushing is pressed into cover straight and flange of bushing is down flat on boss.

(2) Press bushing into gear housing (fig. 5-27). Be sure bushing is pressed into housing straight and flange of bushing is down flat on boss.

(3) Press new clutch housing bushing into housing (fig. 5-28). Be sure bushing is pressed into housing straight and is flush with inside boss.

(4) Press two new drum bushings into drum, one in each end (fig. 5-29). Be sure bushings are pressed in straight and flange of bushings is down flat against shoulders in drum.

(5) Install keys on shaft (fig. 5-30).

(6) Paint short end of shaft and keys with white lead up to back side of keys. Align keyways in hub with keys in shaft and press hub on shaft with long boss of hub toward short end of shaft. Press until hub is centered on keys.

(7) Screw 5/16-18 studs into hub (fig. 5-31).

NOTE: *Studs are to align with bolt holes in gear.*

(8) Press gear on hub and remove studs.

(9) Secure gear to hub with capscrews and washers. Tighten screws evenly.

(10) Insert drum shaft with gear through housing (fig. 5-24).

(11) Mount gasket onto cover and position cover on housing.

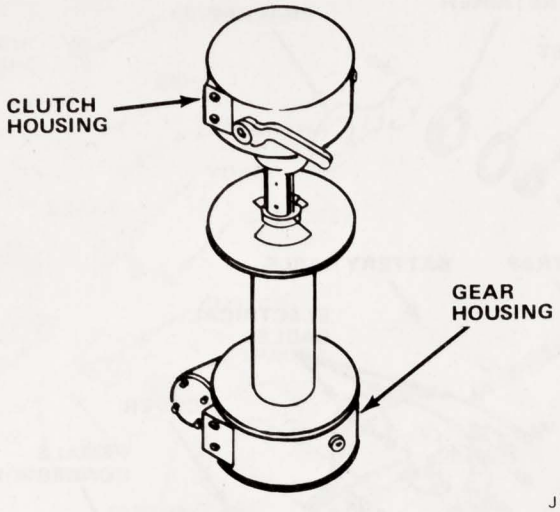


Fig. 5-19 Removing Clutch Housing

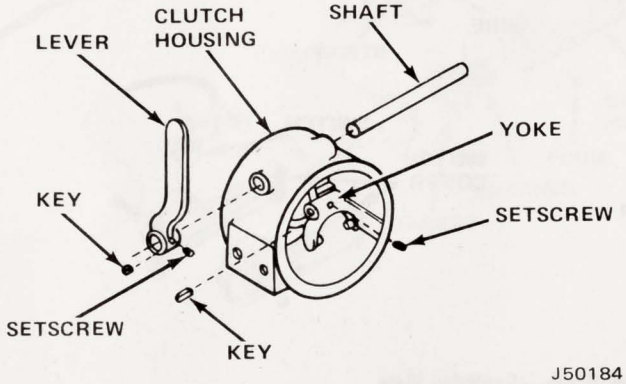


Fig. 5-20 Clutch Housing Components

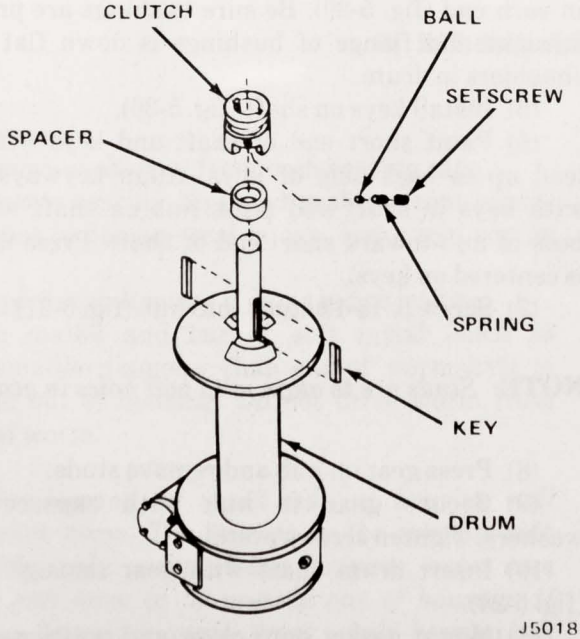


Fig. 5-21 Jaw Clutch and Drum Components

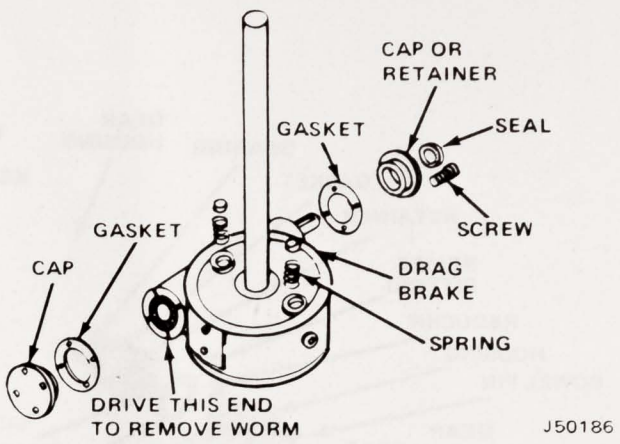


Fig. 5-22 Gear Housing Components

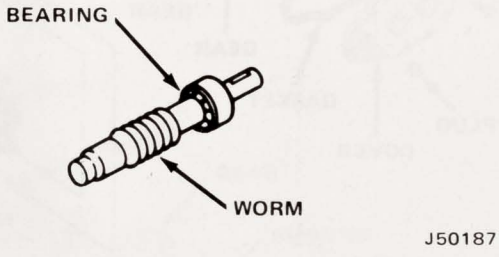


Fig. 5-23 Worm and Worm Bearing

(12) Fasten cover in place with capscrews. Tighten capscrews evenly.

(13) Turn drum shaft in housing. It should spin freely. Add another gasket under cover if it is tight or binds.

(14) Install bearing on short end of wormshaft (fig. 5-32).

(15) Insert worm in gear housing and press bearing (installed on worm) in place. Be sure bearing is down against shoulder in housing.

(16) Mount gasket to cap.

(17) Install cap on housing using capscrews. Tighten capscrews evenly.

(18) Press input bearing into gear housing (fig. 5-33).

(19) Press seal into cap.

(20) Mount gasket on cap. Use a seal slip or strip of shim stock wrapped around shaft to protect seal and install cap on housing with capscrews. Tighten capscrews evenly.

(21) Grease face of gear housing and drum shaft with good cup grease.

(22) Install poppet springs in poppet holes of gear housing (fig. 5-34).

(23) Place small daub of grease on one side of each poppet disc brake to keep disc in place while drum is being installed. Place disc on top of springs.

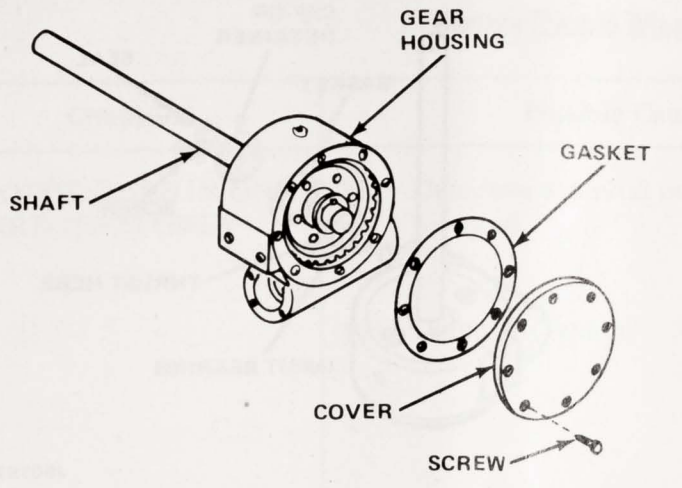


Fig. 5-24 Gear Cover and Housing

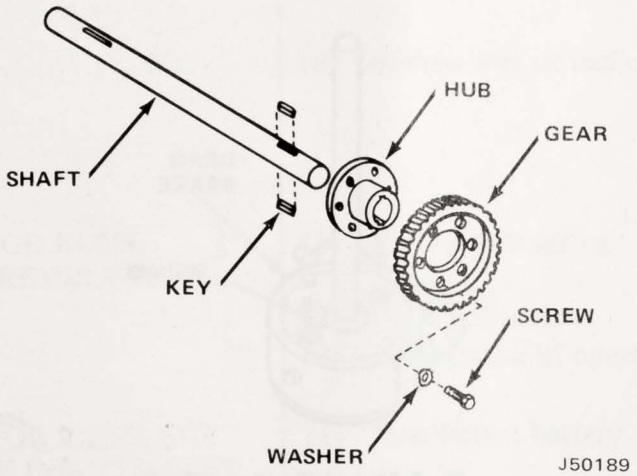


Fig. 5-25 Worm Gear and Hub

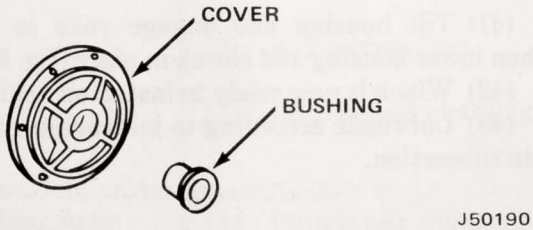


Fig. 5-26 Installing Gear Housing Cover Bushing

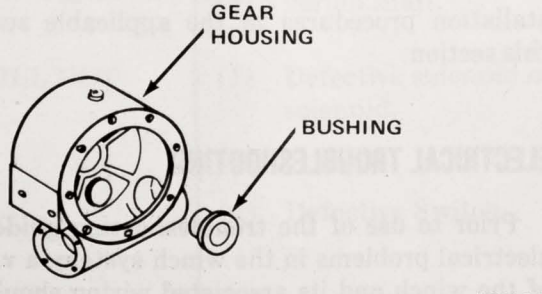


Fig. 5-27 Installing Gear Housing Bushing

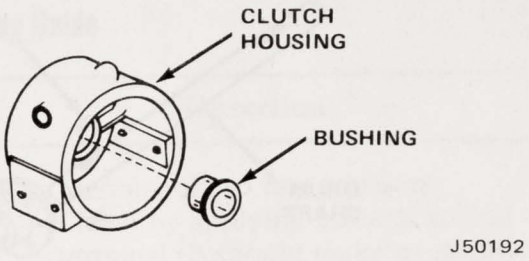


Fig. 5-28 Installing Clutch Housing Bushing

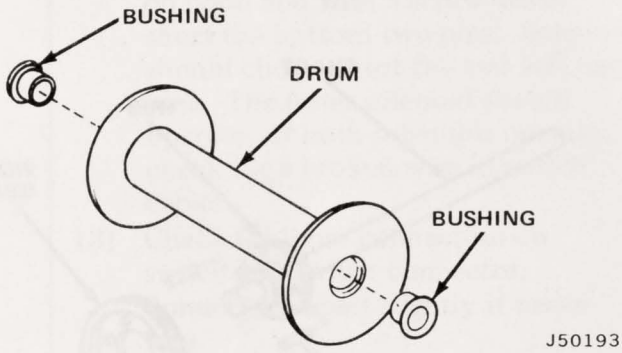


Fig. 5-29 Installing Drum Bushings

(24) Slide drum on drum shaft with jaw clutch side up.

(25) Be sure brake discs are aligned with holes in housing and clamp drum to housing.

(26) Slide spacer on drum shaft (fig. 5-21).

(27) Install keys in shaft above spacer (fig. 5-21).

(28) Remove clamps from drum flange.

(29) Slide jaw clutch on shaft (fig. 5-21). Turn to engage with jaws on drum.

(30) Locate and drill seats for poppet ball if new drum shaft has been installed. Engage jaw clutch with jaws on drum. Use 1/4-inch drill and jaw clutch poppet hole as a jig to drill spot on shaft approximately 1/16-inch deep. Slide jaw clutch up until there is approximately 1/8-inch clearance between jaws. Drill similar spot on shaft.

(31) Be sure poppet hole is aligned with seat in drum shaft and install ball, spring, and screw (fig. 5-21).

(32) Turn poppet screw in (clockwise) until screw head is flush with outside of jaw clutch.

(33) Install key in yoke (fig. 5-20).

(34) Hold yoke in position in housing and slide shaft through housing and yoke.

(35) Tighten setscrew in yoke when shaft is in place.

(36) Mount handle on shaft. Align keyways and tap key place.

(37) Tighten setscrew in handle (fig. 5-20).

(38) Stake key in place to prevent it from working out.

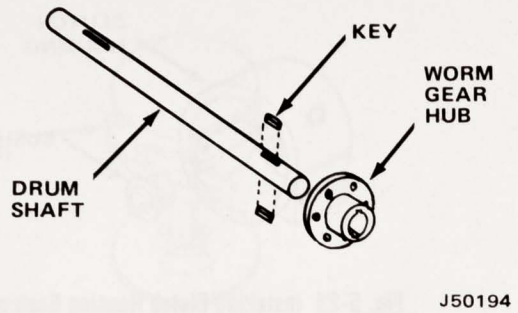


Fig. 5-30 Installing Worm Gear Hub on Drum Shaft

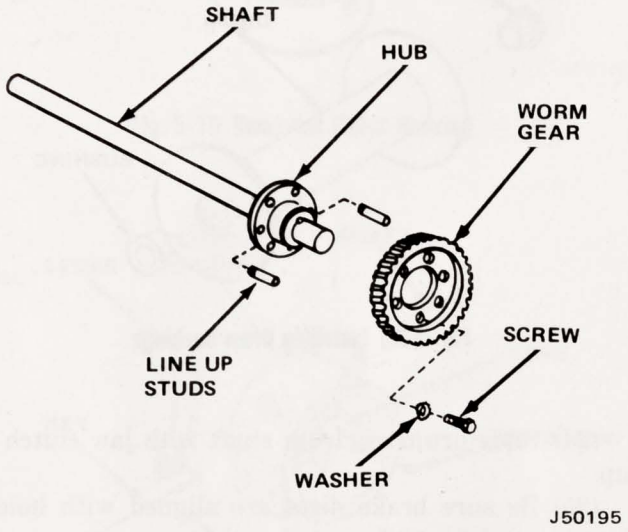


Fig. 5-31 Installing Worm Gear

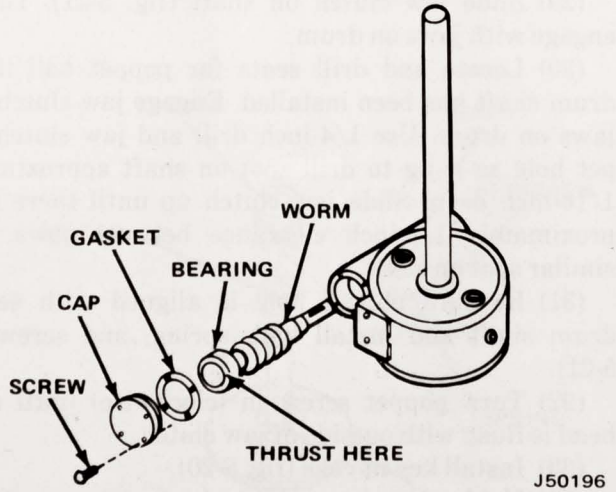


Fig. 5-32 Installing Worm

(39) Install clutch housing. Raise jaw clutch to top of keys (fig. 5-17).

(40) Extend jaw clutch yoke as far forward as possible.

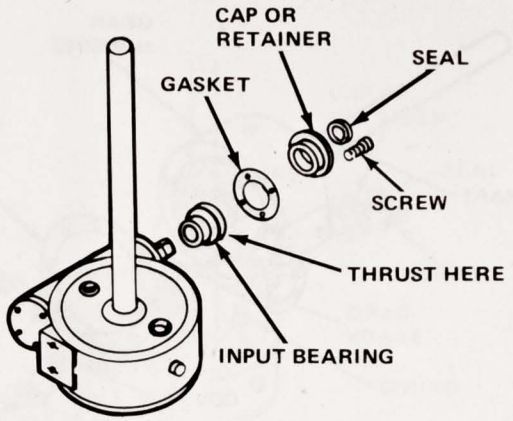


Fig. 5-33 Installing Input Bearing and Cap

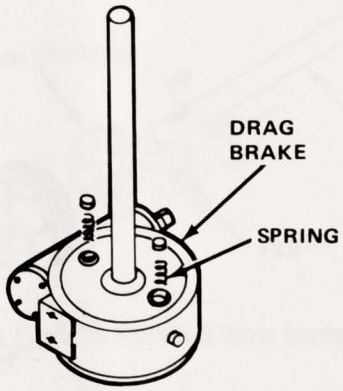


Fig. 5-34 Installing Poppet Brakes

(41) Tilt housing and engage yoke in jaw clutch, then lower housing and clutch in place (fig. 5-17).

(42) Winch is now ready to install on vehicle.

(43) Lubricate according to instructions in appropriate subsection.

INSTALLATION

To install the winch after servicing, refer to the installation procedures in the applicable subsection of this section.

ELECTRICAL TROUBLESHOOTING

Prior to use of the troubleshooting guide to isolate electrical problems in the winch system, a visual check of the winch and its associated wiring should be made to rule out such obvious defects as bad connections and broken wires. After the visual check, follow the troubleshooting guide to isolate problems.

Ramsey Electric Winches—Troubleshooting Guide

Condition	Possible Cause	Correction
MOTOR RUNS IN ONE DIRECTION ONLY	(1) Defective solenoid or stuck solenoid.	(1) Jar solenoid to free contacts. Check by applying 12 volts to coil terminal (it should make an audible click when energized)
	(2) Defective switch.	(2) Disengage winch clutch or remove armature lead. Remove switch plug from hood. Raise connector cover on hood and with a screw driver, short the bottom two pins. Solenoid should click. Short the two left hand pins. The other solenoid should operate. If both solenoids operate, check for a broken wire in switch cable.
	(3) Broken wire or bad connection.	(3) Check for loose connection on switch and switch connector. Spread pins apart slightly if necessary.
MOTOR RUNS EXTREMELY HOT	(1) Armature dragging.	(1) Check bushings for excessive wear. Replace if worn badly.
	(2) Defective motor.	(2) Replace if cause not determined.
	(3) Long period of operation.	(3) Allow to cool.
MOTOR RUNS, BUT WITH INSUFFICIENT POWER, OR WITH LOW LINE SPEED	(1) Insufficient battery.	(1) Check battery terminal voltage under load. If 10 volts or less, replace or parallel another battery to it.
	(2) Battery to winch cable too small.	(2) Check battery to ground (chassis) cable. Must be No. 2 or larger.
	(3) Bad connection.	(3) Check battery terminals for corrosion; clean and grease.
	(4) Insufficient charging system.	(4) Replace with larger capacity charging system.
MOTOR RUNS, BUT DRUM DOES NOT TURN	(1) Clutch not engaged. (2) Sheared drum shaft key. (3) Stripped bronze gear. (4) Parted shaft.	(1) If clutch engaged but symptom still exists, it will be necessary to disassemble winch to determine cause and repair.
MOTOR WILL NOT OPERATE	(1) Defective solenoid or stuck solenoid.	(1) Jar solenoid to free contacts. Check by applying 12 volts to coil terminal (it should make an audible click when energized)
	(2) Defective Switch.	(2) Disengage winch clutch or remove armature lead. Remove switch plug from hood. Raise connector cover on hood and with a screw driver, short the bottom two pins. Solenoid should click. Short the

Ramsey Electric Winches—Troubleshooting Guide (Continued)

Condition	Possible Cause	Correction
MOTOR WILL NOT OPERATE (Continued)		two left hand pins. The other solenoid should operate. If both solenoids operate, check for a broken wire in switch cable.
	(3) Defective motor.	(3) If solenoids operate, check for voltage at armature post; if present, replace motor.
	(4) Loose connections.	(4) Tighten connections on bottom side of hood and on motor.
CLUTCH JUMPS OUT UNDER LOAD	(1) Clutch jaws have been damaged or worn by partial engagement on previous heavy pulls.	(1) Replace clutch and drum, or the clutch and clutch ring which is bolted to the drum.
CLUTCH BINDS	(1) Dry or rusty shaft. (2) Keys pulled out of shape.	(1) Clean and lubricate. (2) File off burrs or replace keys.
CLUTCH INOPERATIVE	(1) Loose set screw. (2) Lost key. (3) Bent yoke.	(1) Tighten. (2) Replace. (3) Straighten or replace.
OIL LEAKS FROM HOUSINGS	(1) New seal.	(1) New seals sometimes leak until seated to shaft.
	(2) Seal damaged or worn.	(2) Replace.
	(3) Too much oil.	(3) Drain excess oil per lubrication instructions.
	(4) Damaged gasket.	(4) Replace.

APSCO ELECTRIC PORTABLE WINCH

GENERAL

The electric portable winch can be installed on any standard ball trailer hitch. It can be wired either to the vehicle starter solenoid or directly to the battery. The winch motor is a permanent magnet type, polarized for rotation. Before beginning installation, check kit contents to be sure kit contains all necessary components (fig. 5-35).

INSTALLATION

(1) Install adapter plate and winch assembly on ball trailer hitch.

(2) Attach circuit breaker to vehicle starter solenoid. As an alternate method, attach circuit breaker to positive terminal of battery in the following manner.

(a) Remove nut from positive terminal clamp on battery.

(b) Attach circuit breaker in horizontal position and replace nut.

(c) Do not use ground terminal at battery.

(d) Be sure that circuit breaker does not contact vehicle hood when hood is closed.

(3) Route electrical cable under vehicle. Attach cable at suitable intervals to vehicle frame. Avoid sharp edges or locations where cable might rub.

(4) Attach ground terminal of cable to vehicle frame with 5/16-inch bolt and and locknut. Be sure connection is clean and tight.

(5) Draw male plug and excess cable up through any convenient opening to store inside vehicle (fig. 5-36). When ready to use winch, remove cable and insert male plug into female socket on winch.

CAUTION: *The metal sides of the male plug are notched. DO NOT forcibly insert plug.*

Simply turn plug around until it indexes with the female socket. The completed installation is shown in figure 5-37. Figure 5-38 shows the emergency hand crank installed and remote control lanyard removed from the switch.

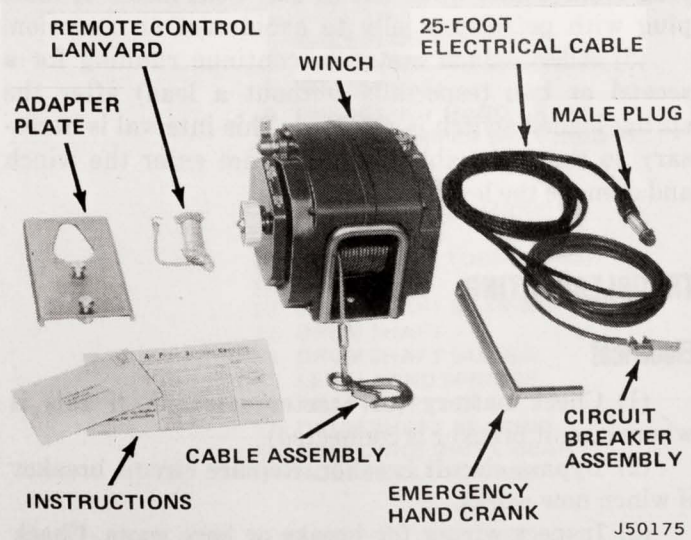


Fig. 5-35 Electric Portable Winch Kit Components

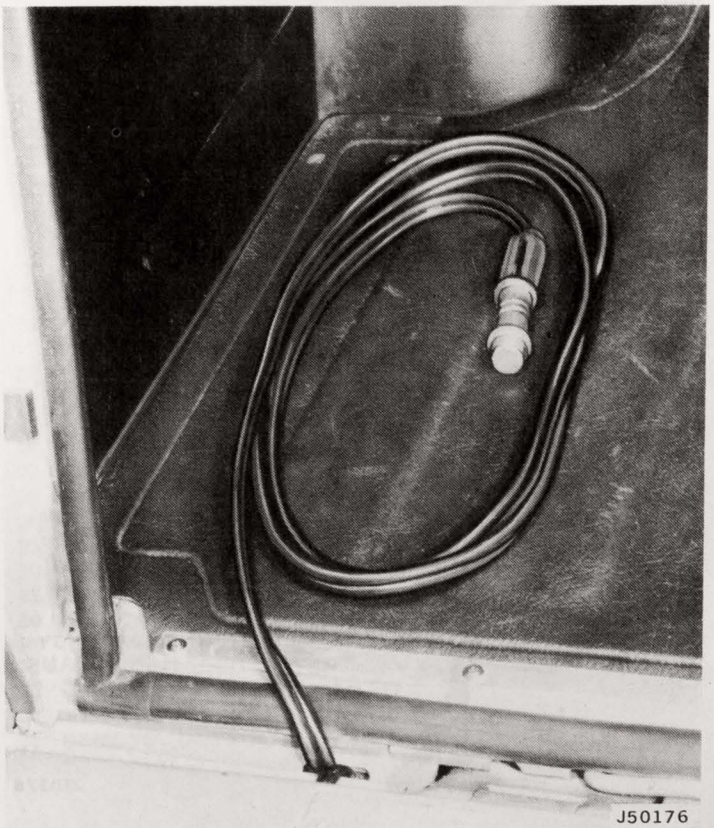


Fig. 5-36 Electrical Cable Routing and Storage—Typical

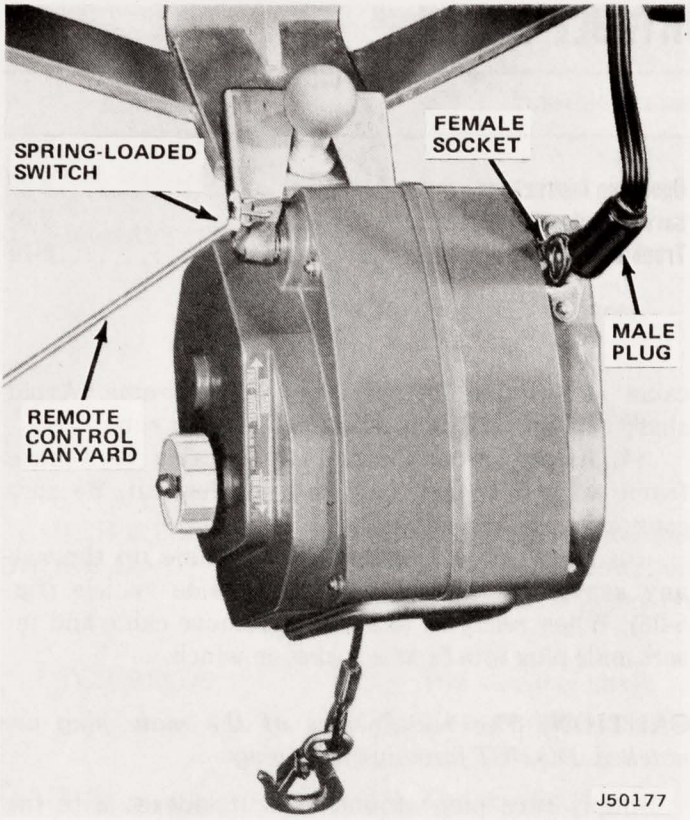


Fig. 5-37 Electric Portable Winch Installed

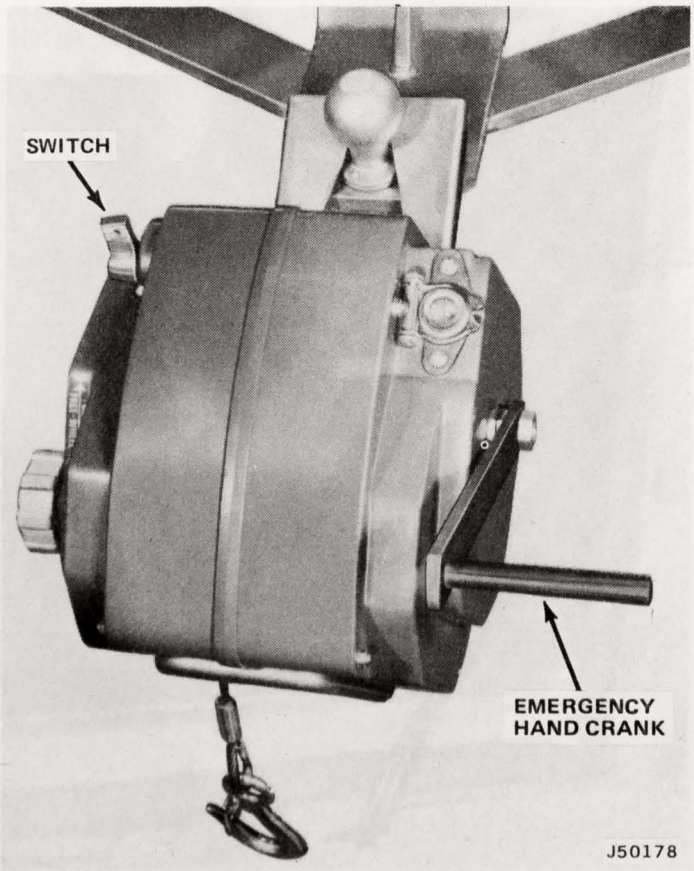


Fig. 5-38 Electric Portable Winch with Emergency Hand Crank Installed

LUBRICATION

Lubricate winch cable and drum occasionally with cable spray as cable is being wound.

Internal winch parts should be lubricated approximately once a year (fig. 5-39). To lubricate:

(a) Remove nut on control knob and unscrew knob.

(b) Remove case on control side and install control knob so that parts will not fall off.

(c) Using a quality grade light engine oil (NOT GREASE), lubricate clutch assembly stud, thrust bearings, roller rear shaft bearing inside, compound drive gear, roller clutch assembly and needle bearing inside, compound pinion rear clutch gear assembly, and needle thrust bearing.

CAUTION: *Take extreme care to avoid getting any oil on the clutch lining, which might cause slippage. Do not remove bearings from inside compound drive gear or compound pinion gear.*

OPERATING INSTRUCTIONS

(1) Install emergency hand crank, if necessary, as follows:

(a) Remove outer nut on rear shaft.

(b) Slide crank on shaft.

(c) Install nut and tighten.

(2) Keep vehicle motor running to ensure full power. Winch will operate more efficiently if it receives full amperage and voltage from battery.

(3) Wind winch cable under power so cable coils are even and tight.

NOTE: *The permanent magnet winch motor may slow down under load. This will not hurt the motor.*

(4) Disconnect wiring for safety by removing male plug from winch when not in use. Coat inside of male plug with petroleum jelly to avoid rust or corrosion.

(5) Allow winch motor to continue running for a second or two (especially without a load) after the spring-loaded switch is released. This interval is necessary so that the cable hook does not enter the winch and damage the level-wind springs.

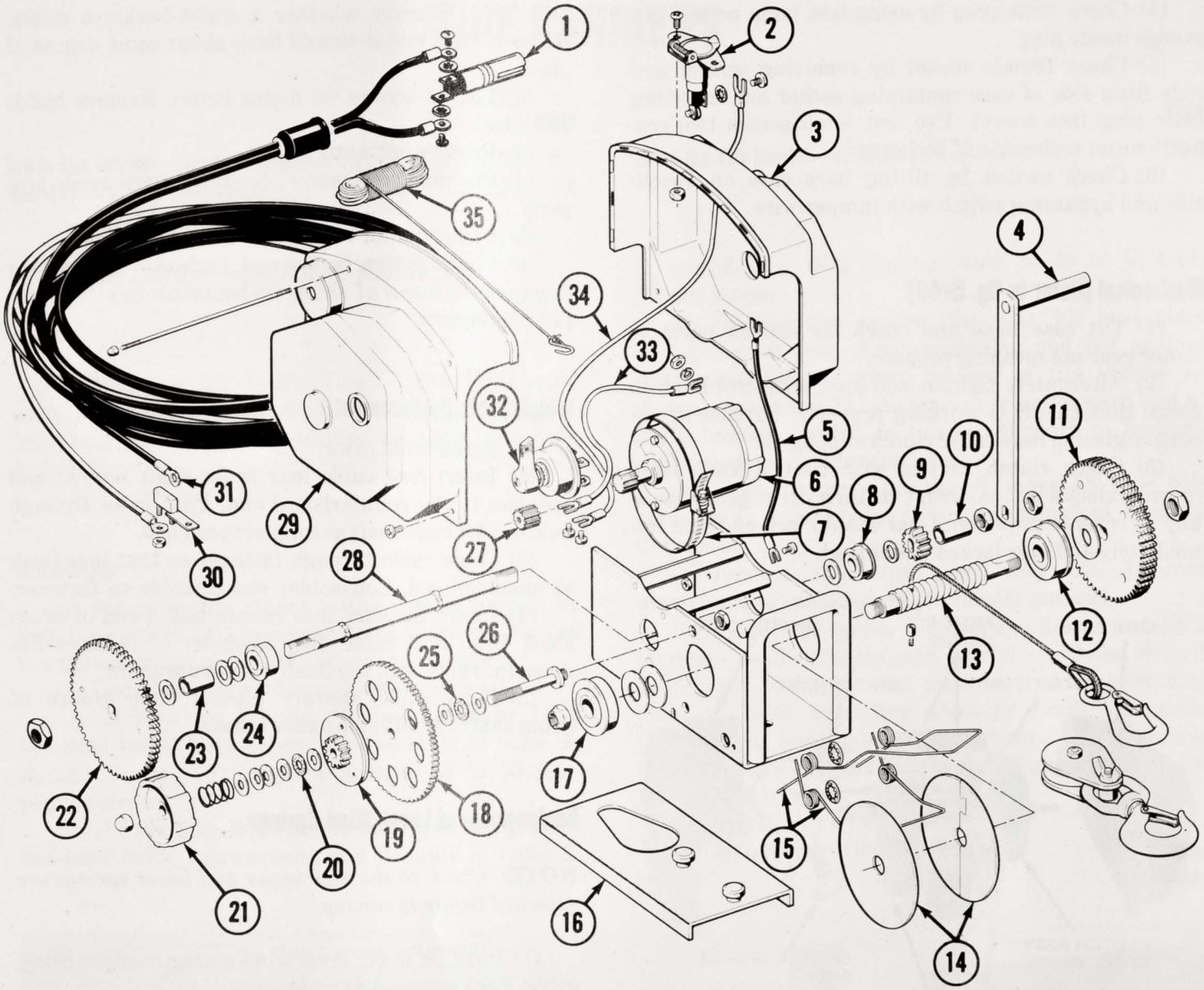
TROUBLESHOOTING

Electrical

(1) Check battery (or starter solenoid, if this is where circuit breaker is connected).

(2) Bypass circuit breaker. Replace circuit breaker if winch now works.

(3) Inspect wiring for breaks or bare spots. Check connections for tightness.



1. MALE PLUG ASSEMBLY
2. FEMALE SOCKET ASSEMBLY
3. RH SIDE CASE
4. EMERGENCY HAND CRANK
5. 12-INCH JUMPER WIRE (RED +)
6. MOTOR
7. MOTOR BAND
8. REAR SHAFT BEARING
9. PINION GEAR
10. REAR SHAFT TUBE (LONG)
11. DRUM GEAR
12. DRUM SHAFT BEARING
13. DRUM SHAFT
14. DRUM SHAFT GUIDES
15. LEVEL WIND SPRINGS
16. ADAPTER PLATE
17. DRUM SHAFT BEARING
18. COMPOUND DRIVE GEAR ROLLER CLUTCH ASSY.
19. PINION CLUTCH GEAR WITH BEARING
20. THRUST BEARING
21. CONTROL KNOB
22. LARGE REAR SHAFT DRIVE GEAR
23. REAR SHAFT TUBE (LONG)
24. REAR SHAFT BEARING
25. THRUST BEARING
26. CLUTCH ASSEMBLY STUD
27. LARGE MOTOR GEAR
28. REAR SHAFT
29. LH SIDE CASE
30. CIRCUIT BREAKER ASSEMBLY
31. GROUND TERMINAL
32. SPRING-LOADED SWITCH
33. 6-INCH JUMPER WIRE (RED +)
34. JUMPER WIRE (BLACK –)
35. REMOTE CONTROL LANYARD

J51079

Fig. 5-39 Electric Portable Winch—Exploded View

(4) Check male plug by using test lamp across two prongs inside plug.

(5) Check female socket by removing screws and rods from side of case containing socket and inserting male plug into socket. Use test lamp across two connections on underside of socket.

(6) Check switch by tilting back case on switch side and bypassing switch with jumper wire.

Mechanical (Refer to fig. 5-40).

(1) Tilt case back and check for broken parts or motor gear not meshing properly.

(2) Alternately tighten and loosen control knob to check that clutch is working properly. (Grease or excessive glazing may cause clutch slippage.)

(3) Check clutch control with control knob loose (counterclockwise). Attempt to turn drive gear manually in reverse direction. Gear should lock on shaft immediately and stay locked under load.

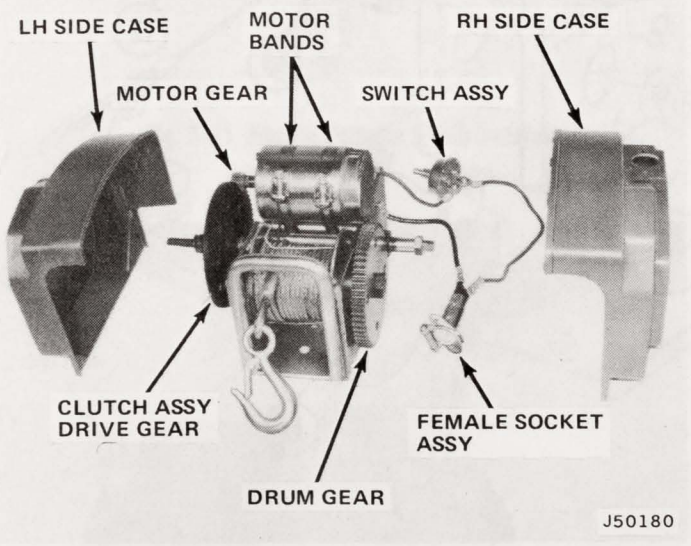


Fig. 5-40 Electric Portable Winch—Side Cases Removed

SERVICE INSTRUCTIONS

(1) Manually turn gears of old motor gently back and forth. Observe whether a slight backlash exists. Gears of new motor should have about same degree of play.

(2) Loosen screws on motor bands. Remove bands and wire.

(3) Remove old motor.

(4) Position new motor. Be sure gears mesh properly.

(5) Fasten motor bands and connect wire lead.

(6) Check motor for correct backlash. Increase or decrease thickness of shims under motor to attain proper adjustment.

Winch Cable Replacement

(1) Remove old cable.

(2) Insert new cable into drum shaft hole at end opposite to the counterboard end. Push cable through hole until it comes out at counterboard end.

(3) Draw cable through fastener so that it is flush at shoulder end. Soft-solder end of cable to fastener.

(4) Insert fastener into counterboard end of drum shaft hole. Pull cable until shoulder of fastener fits down into hole with top flush with drum shaft.

(5) Bend cable sharply around first groove of drum shaft. Wind cable under tension.

Replacement of Level-Wind Springs

NOTE: *Check to see how upper and lower springs are attached before removing.*

(1) Position lower level-wind spring in place below cable. Push spring ends under stud.

(2) Position upper level-wind spring in place above cable. Attach retainers and push ends of springs back.

Replacement of Motor Gear

(1) Remove motor gear from motor shaft.

(2) Replace with new gear (LH thread).

TIRE CARRIERS

INSIDE TIRE CARRIER—CHEROKEE-WAGONEER

General

The Model W-674 Inside Tire Carrier Kit should contain the components shown in figure 6-1. Before beginning work, check to see that all items have been included.

Installation

(1) Assemble tire mount to tire carrier support by installing 3/8-16 by 1 hex-head bolts, lockwashers, and hex nuts. Tighten nuts to 18 foot-pounds torque.

(2) Install five- or six-lug wheels as follows:

(a) Five-Lug Wheels: Install 1/2-20 by 1-1/2 hex-head bolts, lockwashers, and jamnuts in holes A, B, and C (fig. 6-2). Tighten nuts to 40 to 50 foot-pounds torque.

(b) Six-Lug Wheels: Install 7/16-20 by 1-1/2 hex-head bolts, lockwashers, and jamnuts in holes A, D, and E (fig. 6-2). Tighten nuts to 40 to 50 foot-pounds torque.

(3) Position tire carrier (fig. 6-2). Fit base plate into corner at rear of wheelhousing and out against side panel. Locate upper portion of tire carrier as shown, measuring "X" dimension from forward end of angle bracket welded to tubular support to forward end of removable side trim panel.

(4) When properly positioned, mark all four bolt holes, using square holes as locating template. Remove tire carrier.

(5) Remove side trim panel and drill 3/8-inch diameter holes at locations previously marked.

(6) Install tire carrier by inserting 3/8-16 by 1-inch carriage- head bolts through carrier and holes drilled in step (5). Assemble flat washers, lockwashers, and nuts on bolts extending through floor. Assemble backup strip, lockwashers, and nuts on bolts extending through angle clip and side panel. Tighten nuts to 18 foot-pounds torque.

(7) Install side trim panel.

(8) Mount spare tire to tire mount.

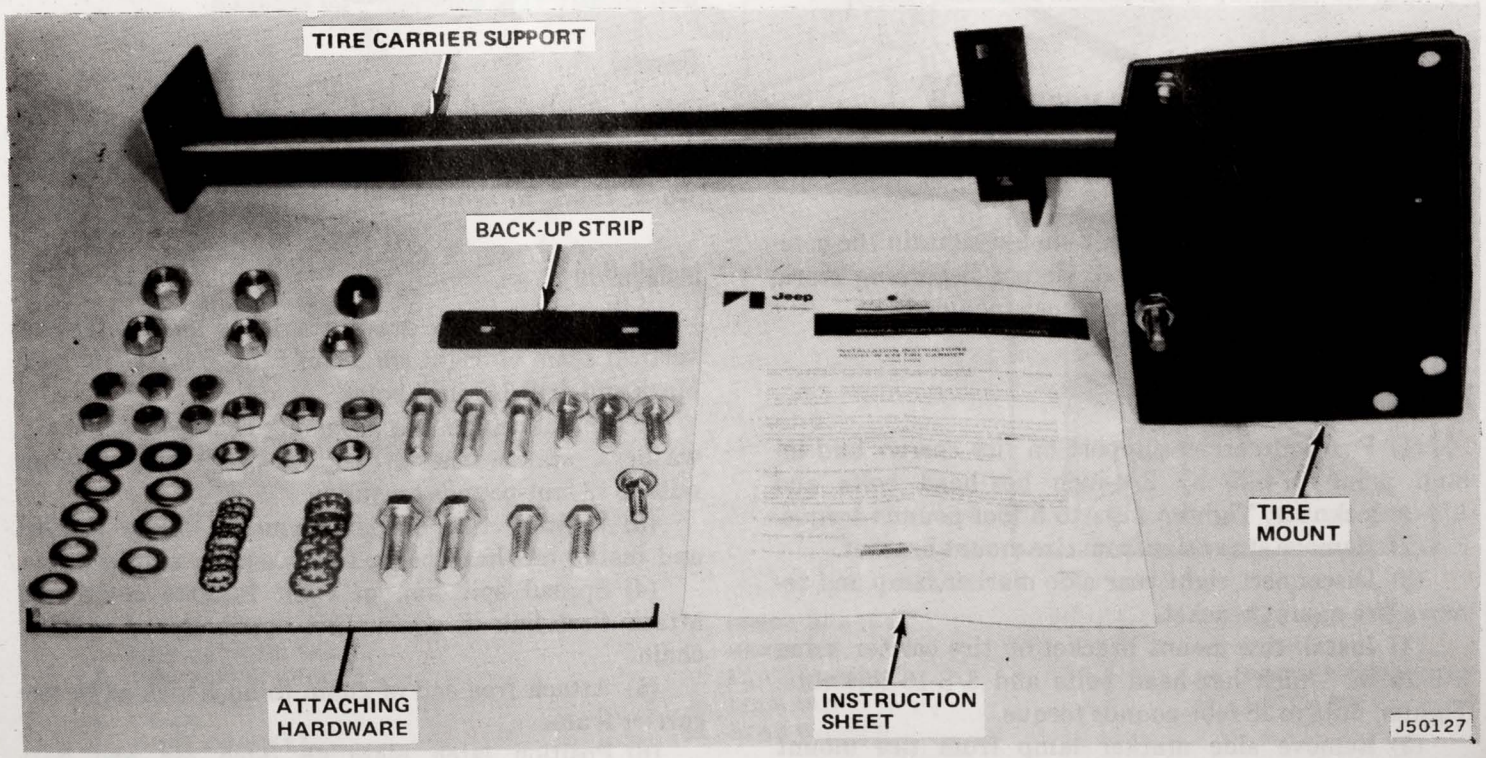
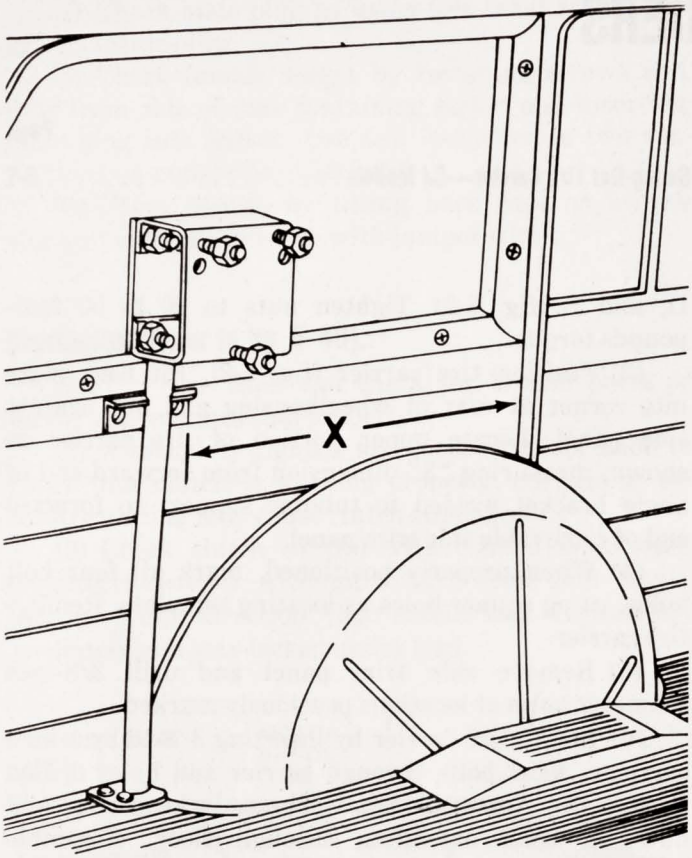


Fig. 6-1 Inside Tire Carrier Kit Components



WAGONEER X - 21 3/4
CHEROKEE X - 21 3/4 WITH SNAP-IN VINYL COVERED TRIM PANEL
X - 21 WITH SHEET METAL SCREW-IN TRIM PANEL

J50128

Fig. 6-2 Inside Tire Carrier Location Dimensions (Inches)

ROOF-TOP TIRE CARRIER—CJ MODELS

General

The roof-top tire carrier kit should contain the components shown in figure 6-3. Before beginning work, check to see that all items have been included.

Installation

(1) Position carrier support on tire carrier and install using 1/4-20 by 3/4-inch hex-head bolts and 1/4-20 locknuts. Tighten nuts to 5 foot-pounds torque.

(2) Remove spare tire from tire mount bracket.

(3) Disconnect right rear side marker lamp and remove tire mount bracket.

(4) Install tire mount bracket on tire carrier using 3/8-16 by 1-inch hex-head bolts and 3/8-16 locknuts. Tighten nuts to 18 foot-pounds torque.

(5) Remove side marker lamp from tire mount bracket and install over hole in rear fender. Connect lamp to wire harness.

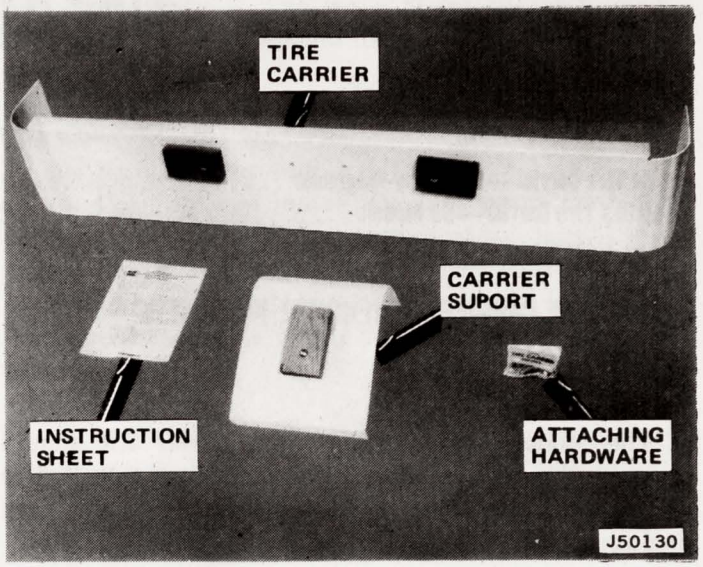


Fig. 6-3 Roof-Top Tire Carrier Kit Components

(6) Place tire carrier on roof and align tire carrier to roof sides and back (fig. 6-4). When properly positioned, mark and drill nine 9/32-inch holes using tire carrier as a template.

(7) Install tire carrier using 1/4-20 by 5/8-inch hex-head bolts, flatwasher, and locknuts. Tighten nuts to 5 foot-pounds torque.

(8) Mount spare tire on tire mount bracket using three wheel nuts.

SWING-OUT TIRE CARRIER—CJ MODELS

General

The swing-out tire carrier kit should contain the components shown in figure 6-5. Before beginning work, check to see that all items have been included.

Installation

(1) Position hinge bracket on body and center over vertical seam on right corner of vehicle body (fig. 6-5). Mark and drill 3/8-inch holes.

(2) Install hinge bracket using hex-head bolts, flat washers, star washers, and hex-head nuts. Tighten nuts to 18 foot-pounds torque.

(3) Position tire carrier frame in hinge bracket and install hex-head bolts, flat washers, and locknuts.

(4) Spread split-link of right tailgate chain and attach first link of chain. Close split-link of tailgate chain.

(5) Attach free end of chain to hook welded to tire carrier frame.

(6) Position latch plate on latch pin and hold against vehicle body. Mark and drill 3/8-inch diameter holes.

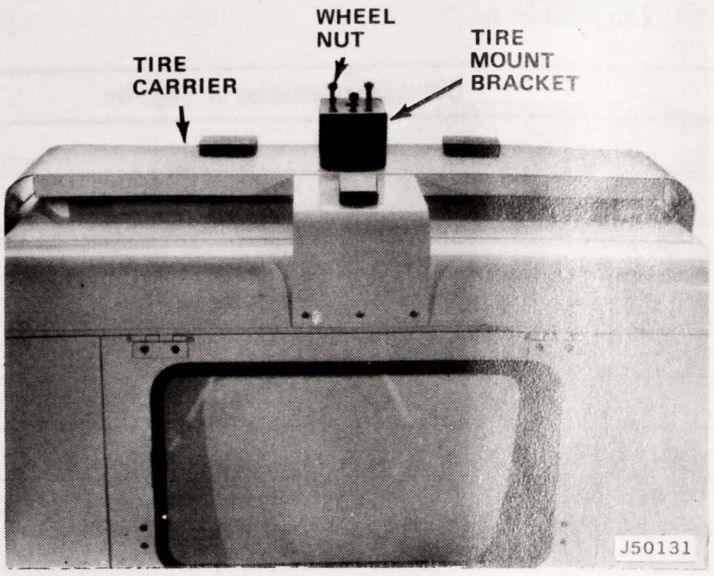


Fig. 6-4 Roof-Top Tire Carrier Installation

(7) Install latch plate on body using hex-head bolts, flat washers, star washers, and hex nuts. Tighten nuts to 18 foot-pounds torque.

(8) Install three stop-bolts in existing holes in tire carrier frame with nut and star washer on each side of frame.

(9) Install rubber caps on stop-bolts and adjust bolts so tire carrier fits tightly against latch pin, yet allows latch pin to operate.

(10) Remove spare tire from tire mount bracket.

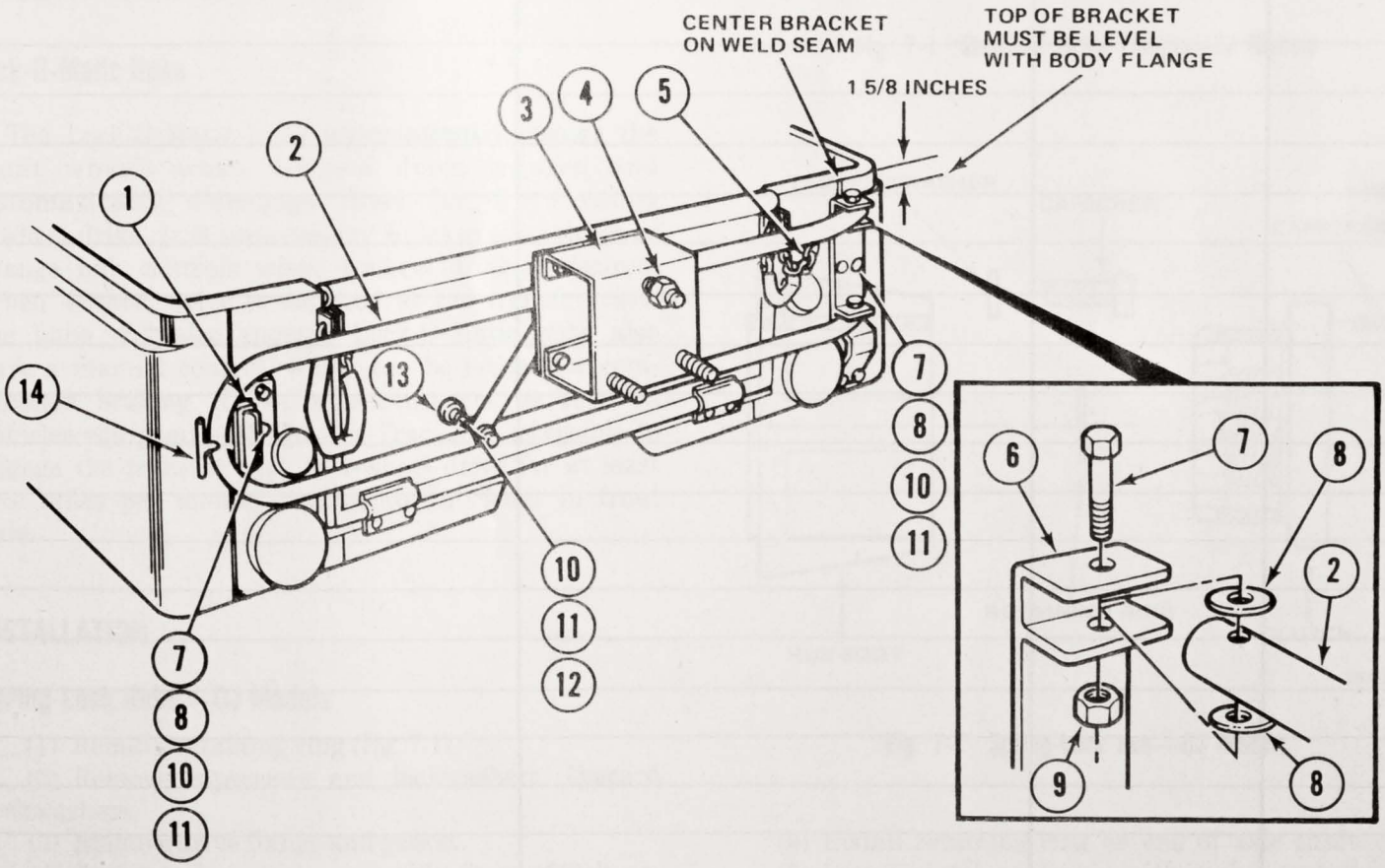
(11) Disconnect right rear side marker lamp and remove tire mount bracket from side of vehicle.

(12) Install tire mount bracket on tire carrier frame using hex-head bolts, star washers, and hex-head nuts. Tighten nuts to 18 foot-pounds torque.

(13) Install 3/8-16 by 1-inch carriage bolts and 3/8-16 by 1-1/2-inch carriage bolts with star washers and hex nuts in holes where tire mount bracket was removed.

(14) Remove side marker lamp from tire mount bracket and install over hole in rear fender. Connect lamp to wire harness.

(15) Mount spare tire on tire mount bracket.



1. LATCH PLATE
2. TIRE CARRIER FRAME
3. TIRE MOUNT BRACKET
4. WHEEL NUT
5. CHAIN
6. HINGE BRACKET
7. HEX BOLT
8. FLAT WASHER
9. LOCK NUT
10. STAR WASHER
11. HEX NUT
12. STOP BOLT
13. RUBBER CAP
14. LATCH PIN

Fig. 6-5 Swing-Out Tire Carrier Installation

TECHNICAL BULLETIN REFERENCE

Date	TB No.	Subject	Changes Information on Page No.

HUBS

GENERAL

Spring-Lock Hubs

Spring-lock hubs are used to disengage the front axle from the power train when the vehicle is in 2-wheel drive. The spring-assisted control dial can be turned manually to either the LOCK or FREE position. With the hubs in LOCK position, the vehicle operates exactly as it would without spring-lock hubs. With the hubs in FREE position, the vehicle operates as a free-wheeling 2-wheel drive, with traction on the rear wheels only. These hubs must not be used on vehicles equipped with Quadra-Trac. It is advisable to engage the hubs for at least five miles per month to circulate lubricant in front axle.

Lock-O-Matic Hubs

The Lock-O-Matic hubs **automatically** engage the front wheels when 4-wheel drive is used and **automatically** disengage them for freewheeling 2-wheel drive. It is unnecessary to leave the vehicle or change hub controls when 4-wheel drive is desired. When 4-wheel drive is engaged at the transfer case, the hubs will also engage. Lock-O-Matic hubs also have a manual control, which can be locked for compression braking. These hubs must not be used on vehicles equipped with Quadra-Trac. It is advisable to engage the transfer case in 4-wheel drive for at least five miles per month to circulate lubricant in front axle.

INSTALLATION

Spring-Lock Hubs—CJ Models

(1) Remove retaining ring (fig. 7-1).

(2) Remove capscrews and lockwashers. Discard lockwashers.

(3) Remove drive flange and gasket.

(4) Separate hub body assembly from clutch assembly (fig. 7-2).

(5) Install hub body assembly and gasket on front wheel hub. Use original capscrews and special tab lockwashers supplied with hubs. Tighten capscrews to 40 to 45 foot-pounds torque. Bend up lockwasher tab against a flat of capscrew head.

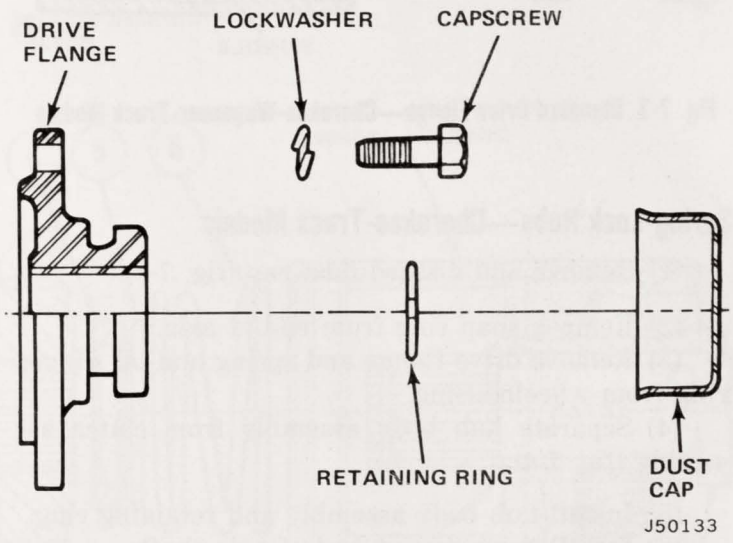


Fig. 7-1 Standard Drive Flange—CJ Models

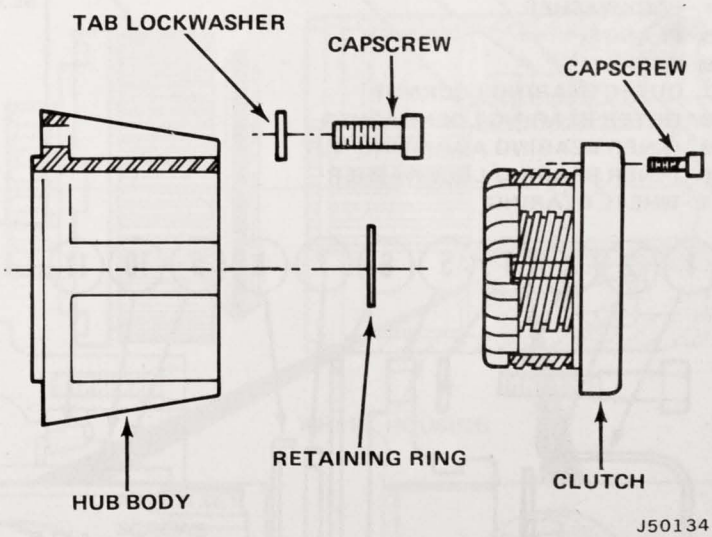


Fig. 7-2 Spring-Lock Hub—CJ Models

(6) Install retaining ring on end of axle shaft.

(7) Install clutch assembly with gasket on body assembly and secure with socket-head capscrews. Tighten capscrews to 6 to 8 foot-pounds torque.

(8) Set both hub control dials at FREE for freewheeling 2-wheel drive.

(9) Install operating instructions decal on instrument panel.

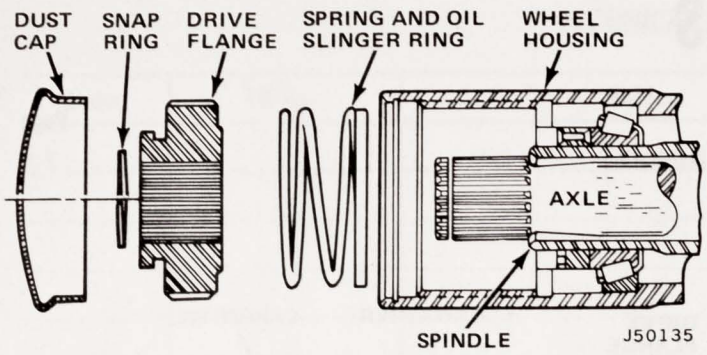


Fig. 7-3 Standard Drive Flange—Cherokee-Wagoneer-Truck Models

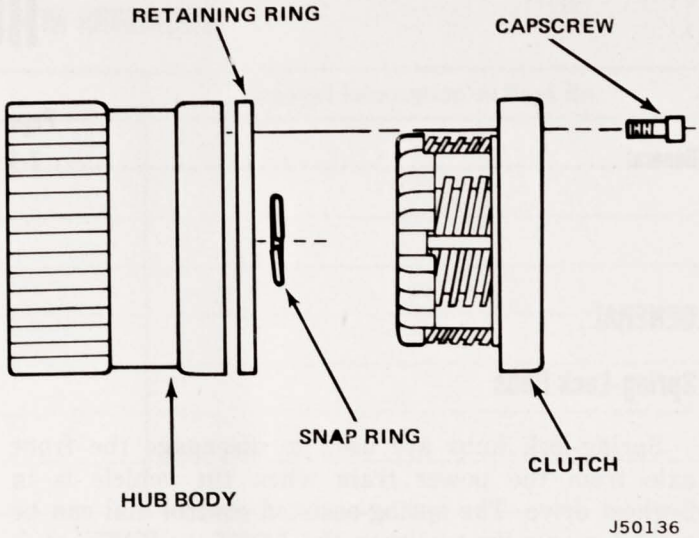


Fig. 7-4 Spring-Lock Hubs—Cherokee-Truck Models

Spring-Lock Hubs—Cherokee-Truck Models

(1) Remove and discard dust cap (fig. 7-3).

(2) Remove snap ring from end of axle.

(3) Remove drive flange and spring and oil slinger ring from wheelhousing.

(4) Separate hub body assembly from clutch assembly (fig. 7-4).

(5) Install hub body assembly and retaining ring.

(6) Install snap ring on end of axle shaft.

(7) Install clutch assembly on body assembly and secure with socket-head capscrews. Tighten capscrews to 4 to 6 foot-pounds torque.

(8) Set both hub control dials at FREE for free-wheeling 2-wheel drive.

(9) Install operating decal on instrument panel.

1. DUST CAP
2. SNAP RING
3. CAPSCREW
4. LOCKWASHER
5. FLANGE
6. GASKET
7. OUTER BEARING LOCKNUT
8. OUTER BEARING LOCKWASHER
9. INNER BEARING ADJUSTING NUT
10. INNER BEARING LOCKWASHER
11. WHEEL BEARING

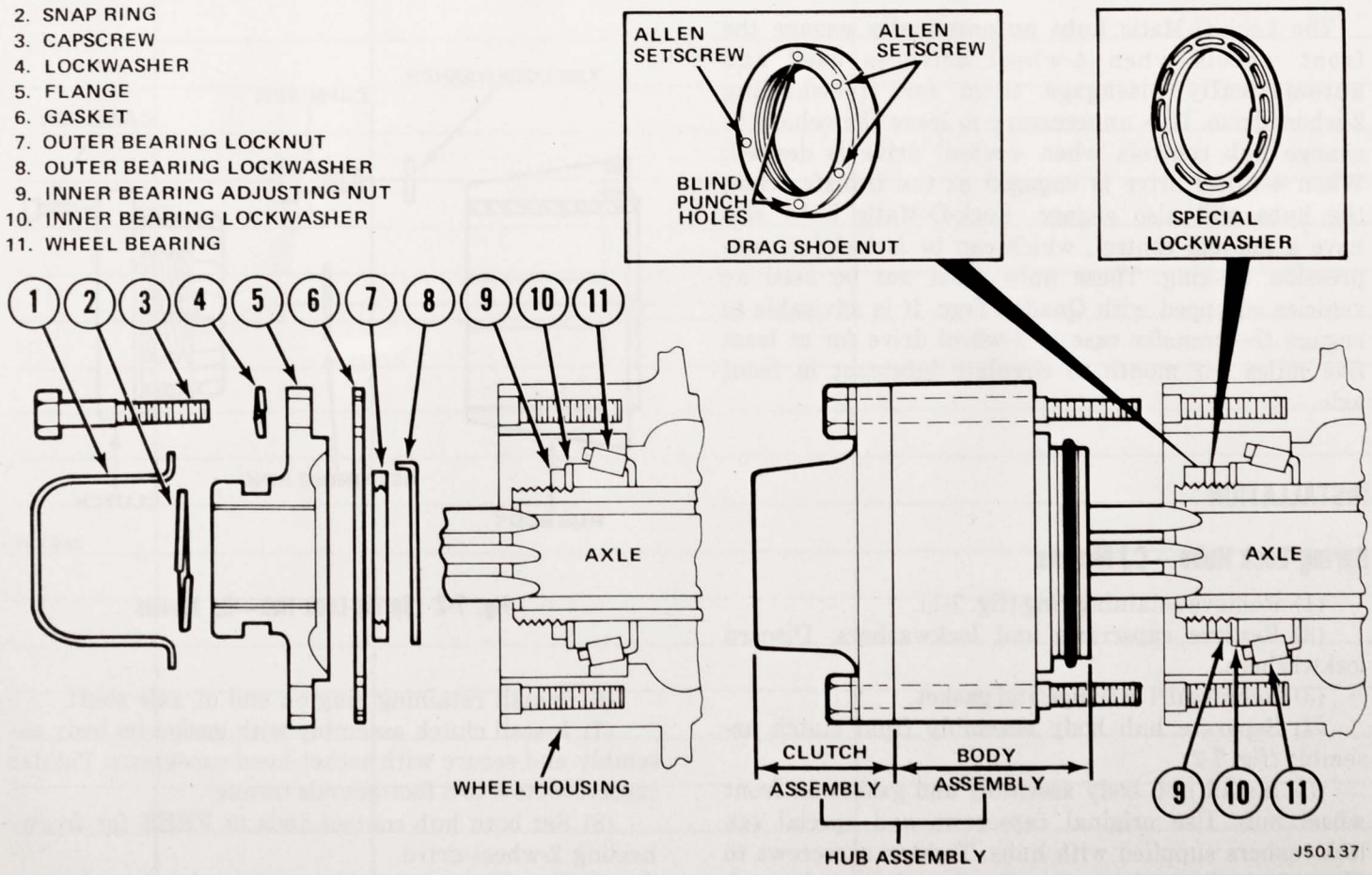


Fig. 7-5 Lock-O-Matic Hubs—CJ Models

Lock-O-Matic Hubs—CJ Models

(1) Remove dust cap (fig. 7-5).

(2) Remove snap ring.

(3) Remove capscrews and lockwashers securing flange to wheelhousing.

(4) Remove flange and gasket.

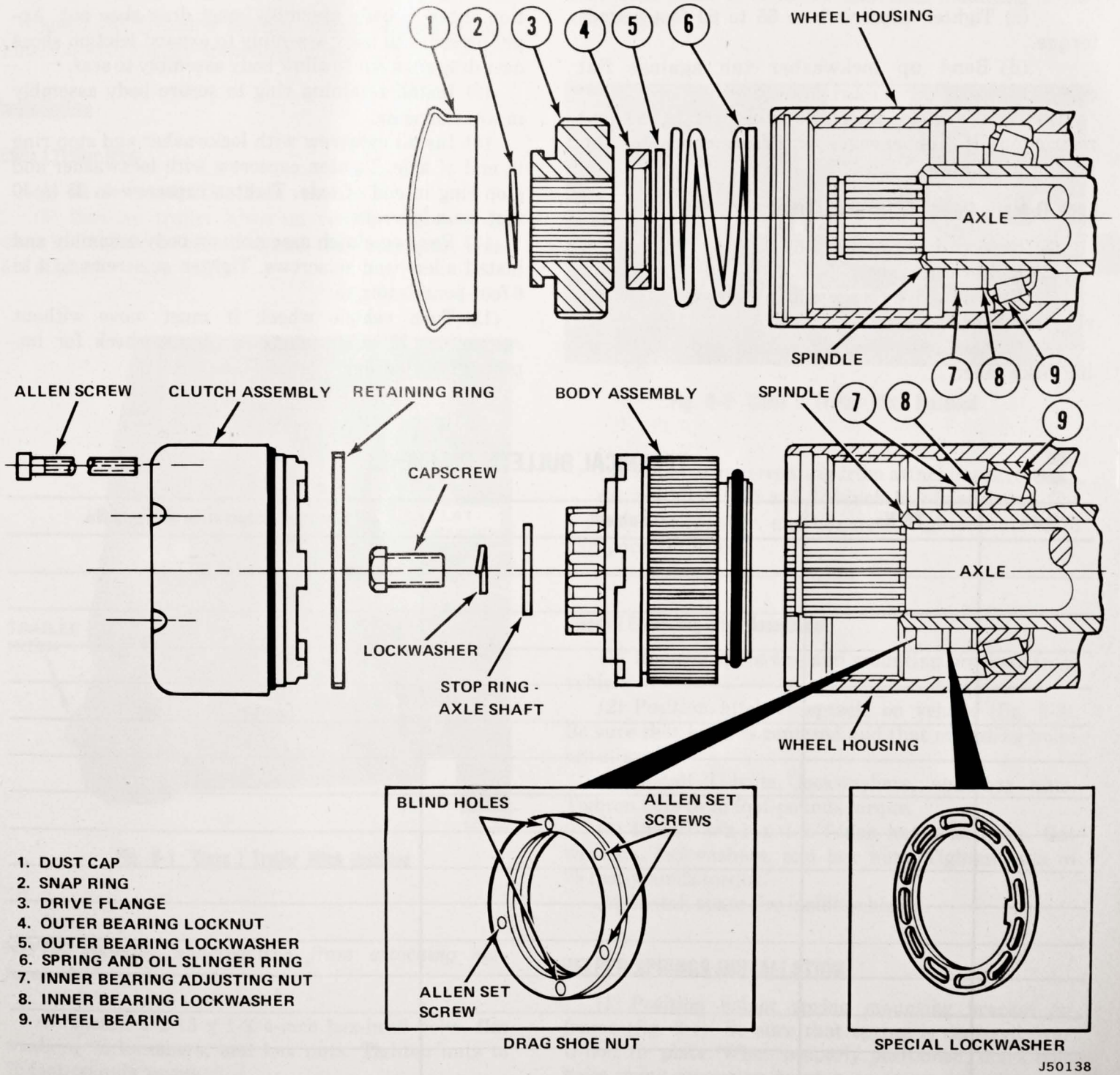
(5) Remove outer bearing locknut and outer bearing lockwasher.

NOTE: *Do not remove inner bearing adjusting nut, inner bearing lockwasher, and wheel bearing from axle.*

(6) Install special lockwasher furnished with hubs.

(7) Install drag shoe nut. Use punch to tighten nut. Tighten setscrews to prevent drag shoe nut from backing off.

(8) Separate steel body assembly from aluminum clutch assembly.



1. DUST CAP
2. SNAP RING
3. DRIVE FLANGE
4. OUTER BEARING LOCKNUT
5. OUTER BEARING LOCKWASHER
6. SPRING AND OIL SLINGER RING
7. INNER BEARING ADJUSTING NUT
8. INNER BEARING LOCKWASHER
9. WHEEL BEARING

Fig. 7-6 Lock-O-Matic Hubs—Cherokee-Truck Models

(9) Align body assembly squarely on drag shoe nut by inserting capscrews opposite each other through body assembly. Alternately tighten capscrews four to five threads. Push center of body assembly into position.

(10) Remove capscrews and install snap ring.

(11) Hold aluminum clutch assembly in position on body assembly and insert capscrews and recessed lockwashers as follows:

(a) Insert lockwasher on capscrew with recessed side up next to head.

(b) Install assembled capscrews in hub assembly.

(c) Tighten capscrews to 55 to 60 foot-pounds torque.

(d) Bend up lockwasher tab against flat capscrew head.

(12) Turn vehicle wheel; it must rotate without restriction. If hub engages or drags, check for improper installation.

Lock-O-Matic Hubs—Cherokee-Truck

(1) Remove dust cap (fig. 7-6).

(2) Remove snap ring.

(3) Remove drive flange and spring and oil slinger ring from wheelhousing.

(4) Remove outer bearing locknut and outer bearing lockwasher.

NOTE: *Do not remove inner bearing adjusting nut, inner bearing lockwasher, and wheel bearing from axle.*

(5) Install special lockwasher furnished with hubs.

(6) Install drag shoe nut. Use wrench furnished with hubs to tighten nut. Tighten setscrews firmly. At least one setscrew will enter the special lockwasher to prevent drag shoe nut from backing off.

(7) Remove screws from clutch assembly and separate hub parts.

(8) Slide body assembly into wheelhousing. Body assembly stops 1/4 inch from full-in position as friction shoes in body assembly meet drag shoe nut. Apply pressure to body assembly to expand friction shoes over drag shoe nut to allow body assembly to seat.

(9) Install retaining ring to secure body assembly in wheelhousing.

(10) Install capscrew with lockwasher and stop ring in end of axle. Tighten capscrew with lockwasher and stop ring in end of axle. Tighten capscrew to 35 to 40 foot-pounds torque.

(11) Position clutch assembly on body assembly and install allen-head setscrews. Tighten setscrews to 4 to 6 foot-pounds torque.

(12) Turn vehicle wheel; it must move without restriction. If hub engages or drags, check for improper installation.

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TRAILER HITCHES AND HELPER SPRINGS

TRAILER HITCHES—CHEROKEE-WAGONEER

General

Class I and II trailer hitches cannot be used in combination with energy-absorbing bumpers.

Installation

Class I Trailer Hitch

(1) Remove spare tire from vehicle.

(2) Position trailer hitch on vehicle (fig. 8-1). Be sure that hitch is centered and that mounting holes are aligned.

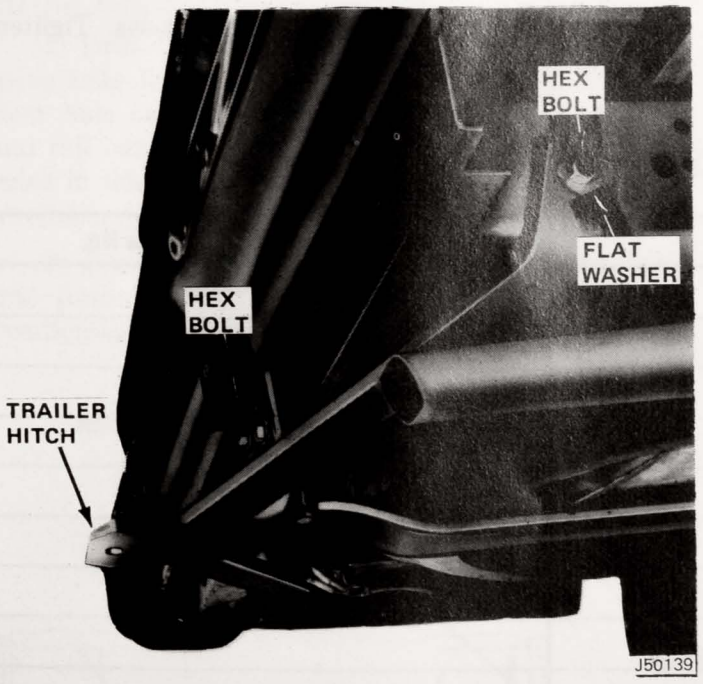

Fig. 8-1 Class I Trailer Hitch Installed

NOTE: *Remove undercoating from attaching surfaces.*

(3) Install 1/2-13 x 1-3/4-inch hex-head bolts, flat washers, lockwashers, and hex nuts. Tighten nuts to 75 foot-pounds torque.

(4) Install spare tire in vehicle.

Class II Trailer Hitch

(1) Position trailer hitch on vehicle (fig. 8-2). Be sure that hitch is centered and that mounting holes are aligned.

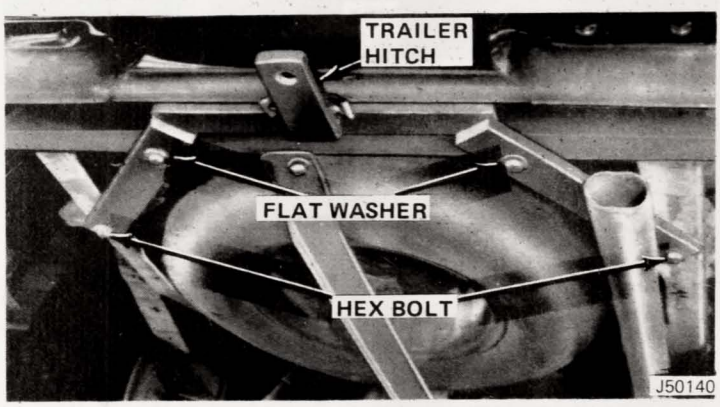

Fig. 8-2 Class II Trailer Hitch Installed

(2) Remove undercoating from attaching surfaces.

(3) Install 1/2-13 x 1-3/4-inch hex-head bolts, flat washers, lockwasher, and hex nuts. Tighten nuts to 75 foot-pounds torque.

Class III Equalizing Hitch Receptacle

(1) Remove spare tire and mounting brackets from vehicle.

(2) Position hitch receptacle on vehicle (fig. 8-3). Be sure that hitch is centered and that mounting holes are aligned.

(3) Install U-bolts, lockwashers, and hex nuts. Tighten nuts to 75 foot-pounds torque.

(4) Install 1/2-1 x 1-3/4-inch hex-head bolts, flat washers, lockwashers, and hex nuts. Tighten nuts to 75 foot-pounds torque.

(5) Install spare tire inside vehicle.

HELPER SPRINGS INSTALLATION

(1) Position helper spring mounting bracket on frame (fig. 8-4). Be sure that spring is centered over U-bolt tie plate. When properly positioned, mark bolt holes using mounting bracket as a template. Remove mounting bracket.

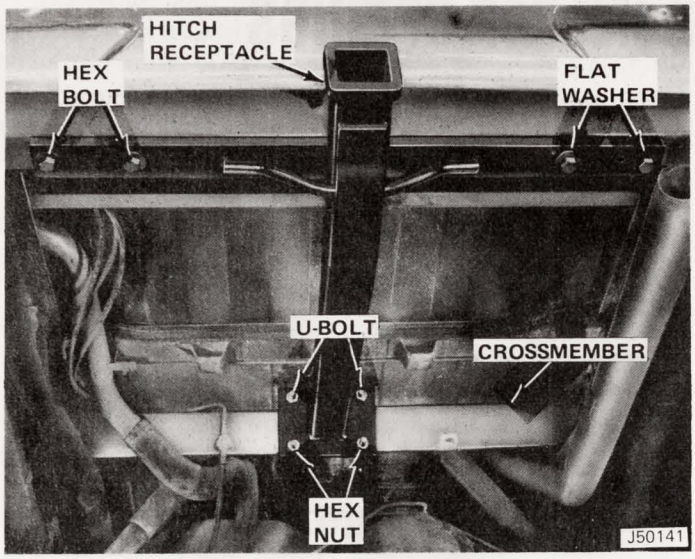

Fig. 8-3 Class III Equalizing Hitch Receptacle Installed

(2) Drill previously marked 3/8-inch diameter holes.

NOTE: *Remove undercoating from attaching surfaces.*

(3) Position helper spring on frame and install hex-head bolts, lockwashers, and hex nuts. Tighten nuts to 31 foot-pounds torque.

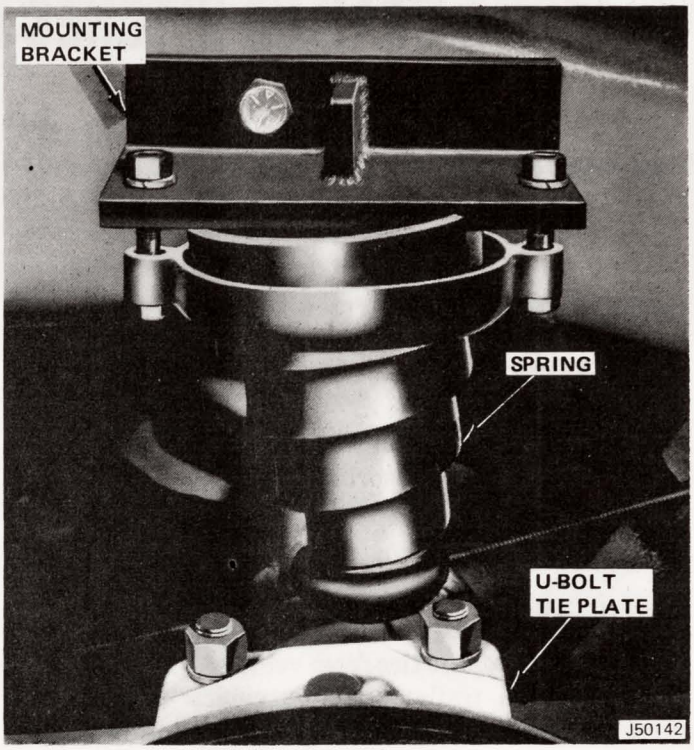

Fig. 8-4 Helper Springs Installed

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ROLL BARS AND PADDING

GENERAL

The roll bars are constructed of 1-inch, 11-gauge tubular steel, welded electrically for maximum strength. Brace angle and design give maximum protection against impact from all directions. The roll bar padding is constructed of thick, molded foam rubber covered by tough vinyl with full zippers.

ROLL BAR INSTALLATION

(1) Place roll bar in vehicle on top of rear wheelhousings. Roll bar must be sprung together slightly to go past lip at top of side panels. Position forward edge of roll bar 6 inches from forward edge of wheelhousing (fig. 9-1).

(2) Drill 3/8-inch diameter holes through body using holes in roll bar angle base plates as a template. Rear hole on bottom of each plate must be marked and roll bar removed before drilling. Drill remaining holes in wheelhousings after roll bar has been bolted to vehicle side panels.

(3) Install side panel bolts, inserting long bolts into foremost and rearmost holes on each side and positioning spacer tubes over these bolts (fig. 9-1).

(4) Lower roll bar into position. Install middle two bolts, lockwashers, and nuts. Install end lockwashers and nuts.

(5) Install bottom bolts, with roll bar bolted to side panels, after drilling three 3/8-inch holes through each wheelhousing using the roll bar angle base plates as a template. Install short bolts into drilled holes, place washer strip into position underneath wheelhousing (fig. 9-1), and install lockwashers and nuts. Install flat washer, lockwasher, and nut on rearmost bolt on each side. Tighten all nuts to 18 foot-pounds torque.

PADDING INSTALLATION

(1) Position 38-1/2-inch pad and cover on horizontal tubing and secure with zipper.

(2) Position pads and covers on vertical tubing and secure with zippers.

(3) Position 36-1/4-inch pads and covers on back support tubing and secure with zippers.

NOTE: *Tapered ends of pads and covers fit to base plate with zippers upward.*

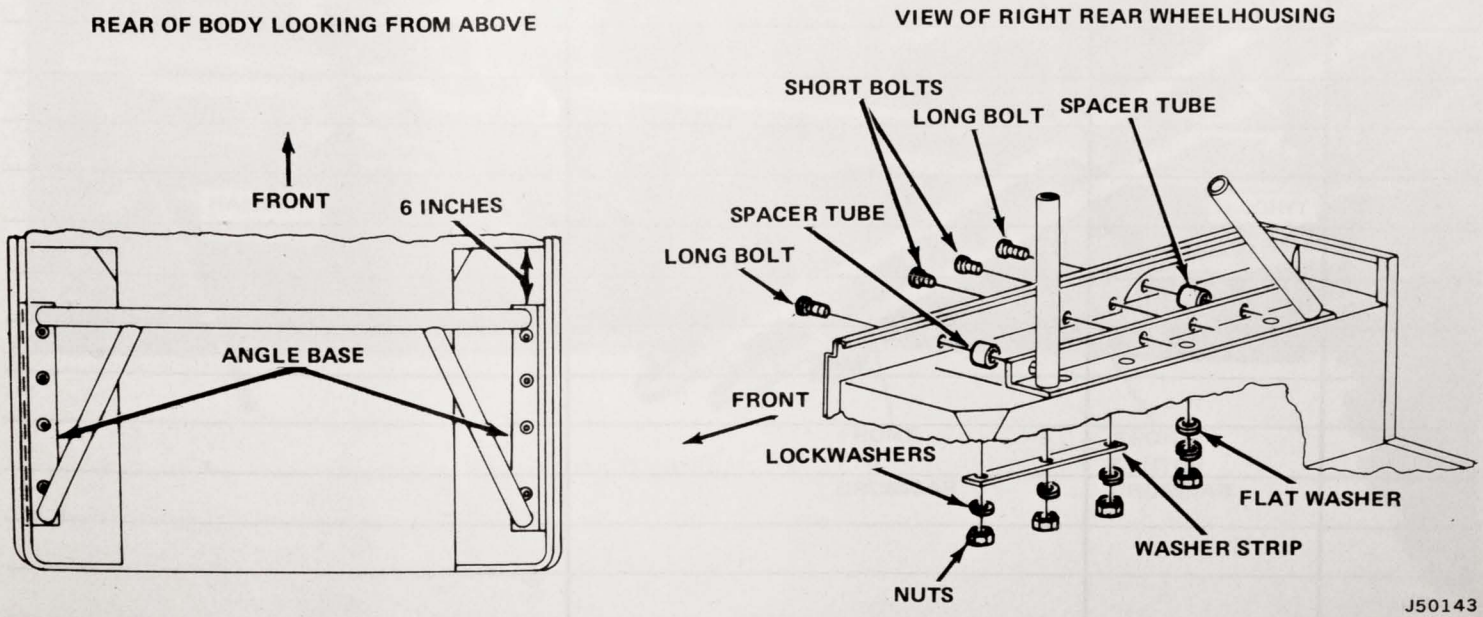

Fig. 9-1 Roll Bar Installation

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WRECKERS

GENERAL

The Mechanical Wrecker Kit is suitable for use on Model 46 trucks with 8,000 pounds gross vehicle weight (GVW). The kit is rated at 4 tons; however, when the kit is installed, actual lifting capacity will be governed by the vehicle.

Various wrecker kits are available for installation on trucks. However wreckers should be ordered complete from the factory because of safety requirements and installation complexities, such as extensive welding and heavy fixturing. Installation instructions, therefore, are limited to selected assemblies and components and are described under Repair/Replacement/Installation of Components.

REPAIR/REPLACEMENT/INSTALLATION OF COMPONENTS

Winch Replacement

(1) Disconnect master link in drive chain and remove chain.

(2) Remove nuts, washers, and bolts attaching winch assembly to stanchion. Remove winch assembly.

(3) To install winch, position winch assembly in stanchion. Attach assembly to stanchion with bolts, washers, and nuts. Tighten to 120 foot-pounds torque.

(4) Install drive chain and connect master link.

Drive and Control Components

Removal

(1) Disconnect master link in drive chain and remove chain.

(2) Remove hanger bearing (fig. 10-1) from mounting and from power takeoff drive shaft.

(3) Remove drive shaft from power takeoff unit.

(4) Remove U-joint and drive sprocket from hanger bearing unit.

(5) Remove front power takeoff control rod from power takeoff unit and front power takeoff control crossbar (fig. 10-2 and 10-3).

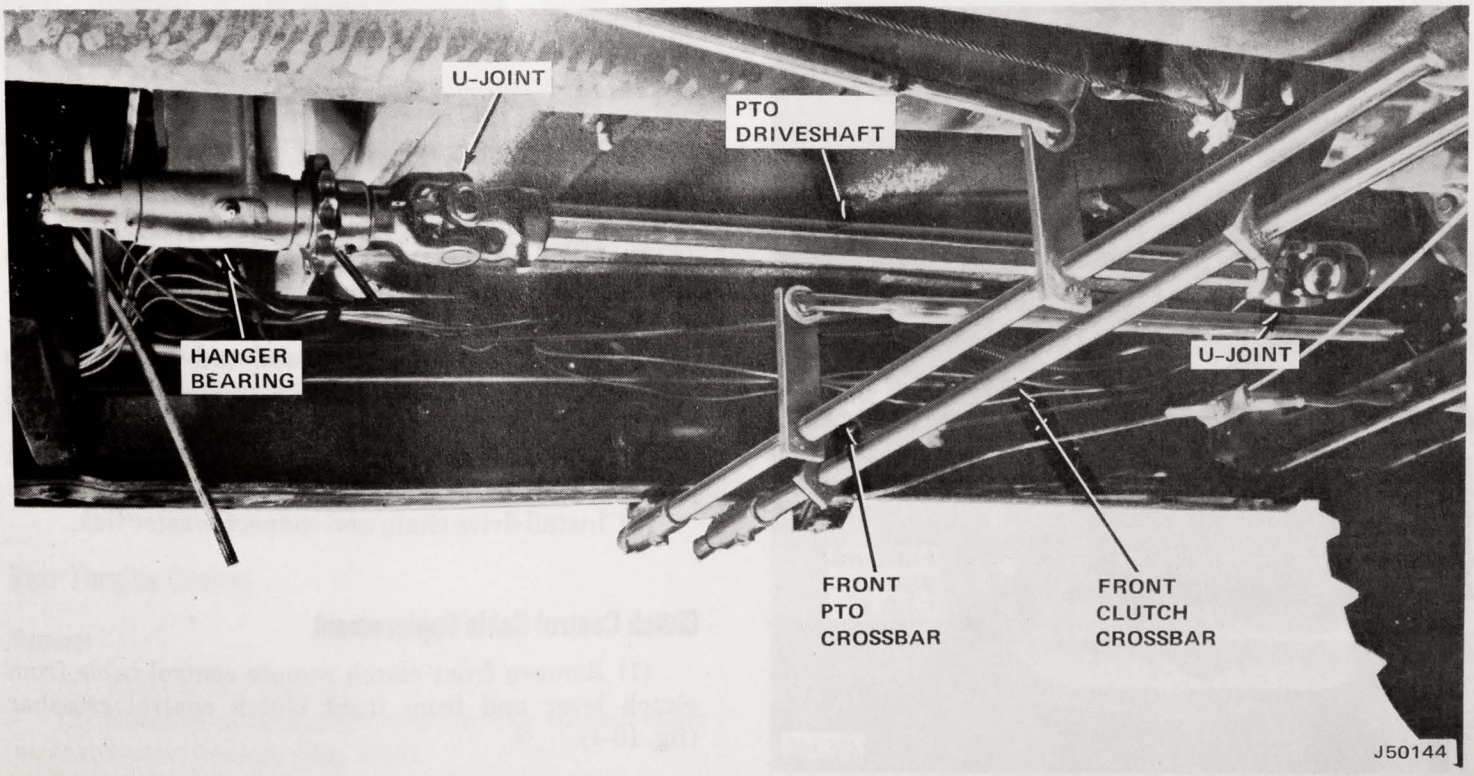


Fig. 10-1 Front Drive and Control Components

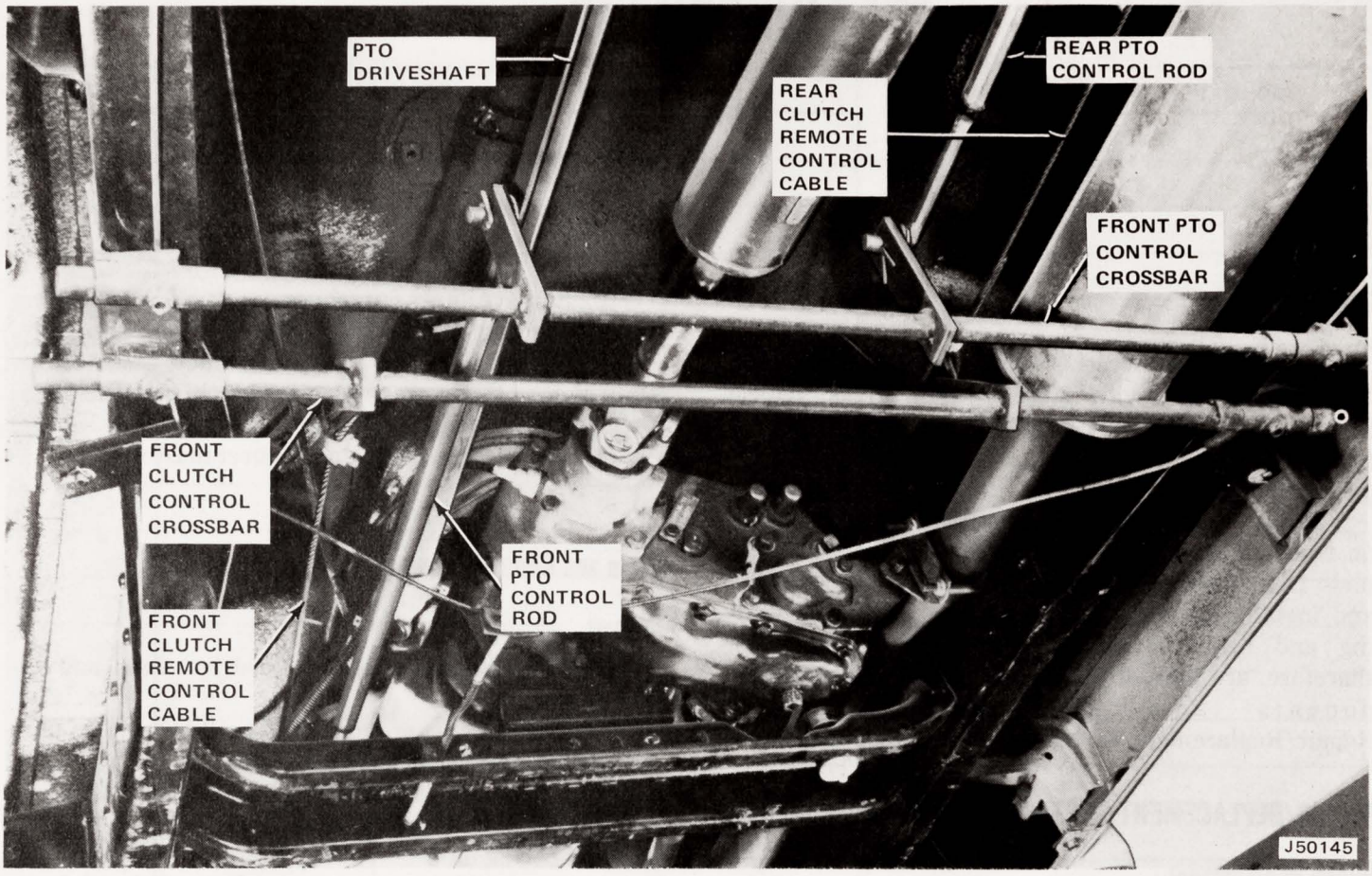


Fig. 10-2 Power Takeoff Installation—Bottom View

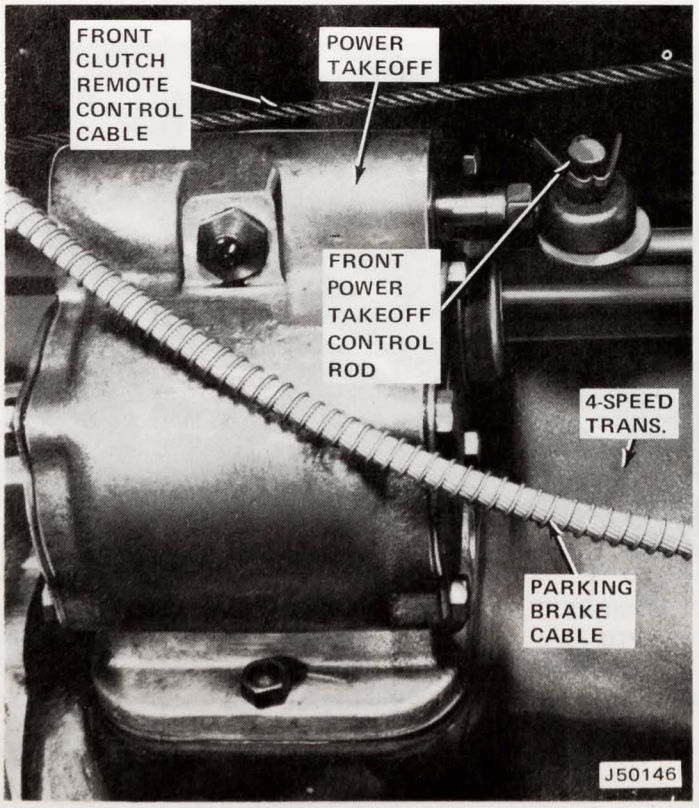


Fig. 10-3 Power Takeoff—Side View

(6) Remove rear power takeoff control rod from front power takeoff control crossbar and rear power takeoff control crossbar.

Installation

(1) Install rear power takeoff control rod on front and rear power takeoff control crossbars.

(2) Install front power takeoff control rod on power takeoff unit and front power takeoff unit crossbar.

(3) Install drive sprocket and universal joint to hanger bearing shaft.

(4) Install drive shaft in power takeoff unit.

(5) Install hanger bearing on mounting and on power takeoff drive shaft.

(6) Install drive chain and connect master link.

Clutch Control Cable Replacement

(1) Remove front clutch remote control cable from clutch lever and from front clutch control crossbar (fig. 10-4).

(2) Remove rear clutch remote control cable from front and rear clutch control crossbars (fig. 10-5).

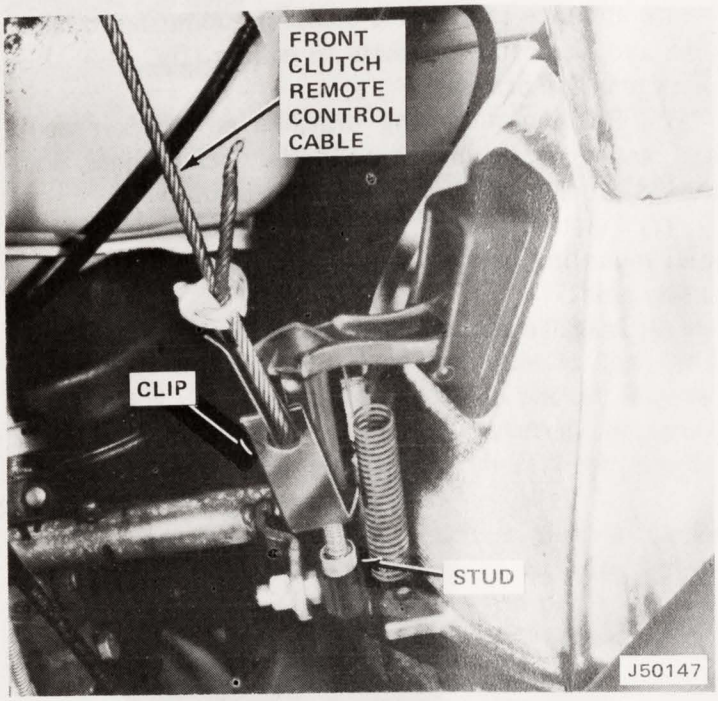


Fig. 10-4 Front Clutch Cable Installation

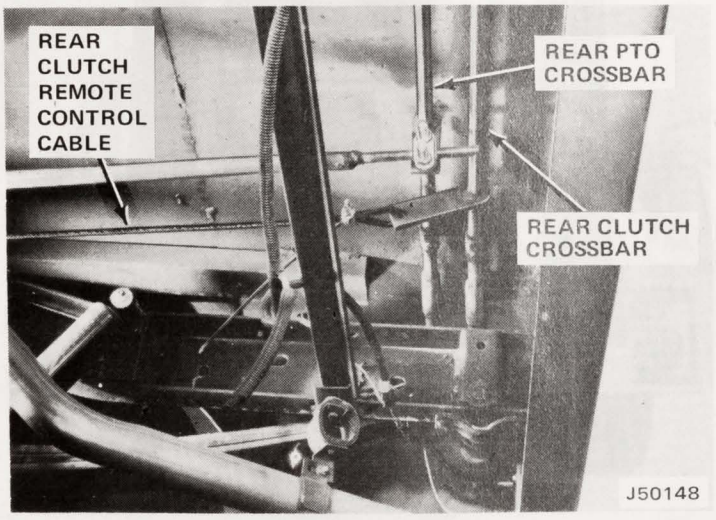


Fig. 10-5 Rear Clutch Cable Installation

(3) Install front clutch control cable by attaching cable to clutch lever and front clutch control crossbar.

(4) Install rear clutch control cable by attaching front and rear clutch control crossbars. Check operation and adjust cable, if necessary.

Rear Throttle Control

Removal

(1) Remove air cleaner.

(2) Remove cable clamp from throttle control cable at carburetor linkage (fig. 10-6).

(3) Remove hex nut securing throttle cable to bracket at rear of engine.

(4) Remove nut and washer from back of throttle control in quarter panel (fig. 10-7). Remove assembly and pull cable through chassis.

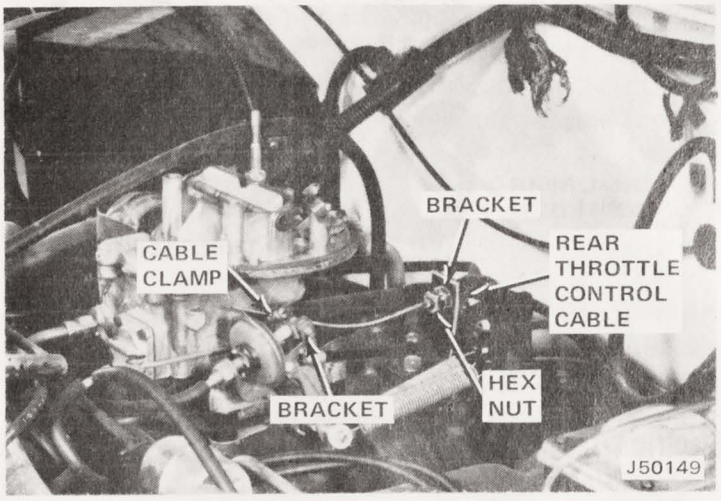


Fig. 10-6 Rear Throttle Control Cable at Carburetor

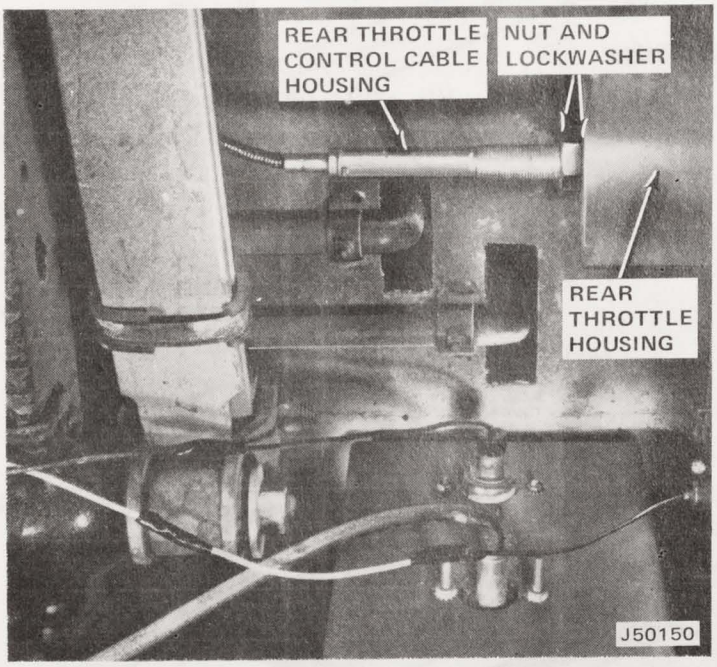


Fig. 10-7 Rear Throttle Control Cable and Housing

Installation

(1) Position rear throttle control assembly in quarter panel (fig. 10-8). Install washer and nut on back of assembly.

(2) Route cable forward through vehicle chassis to carburetor (fig. 10-6).

(3) Install cable in bracket at rear of engine and secure with hex nut.

(4) Install cable clamp on cable.

(5) Install air cleaner.

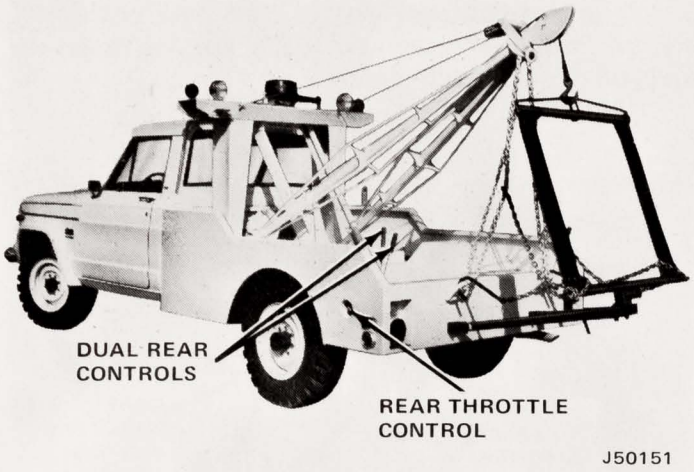


Fig. 10-8 Wrecker Kit Installed

Electric Wrecker Kit

For service information on electric wrecker winch see Section 5—Winches.

Passenger Car Sling

Installation

(1) Hook main lift cable into top bar and raise complete sling assembly with main lift cable (fig. 10-9).

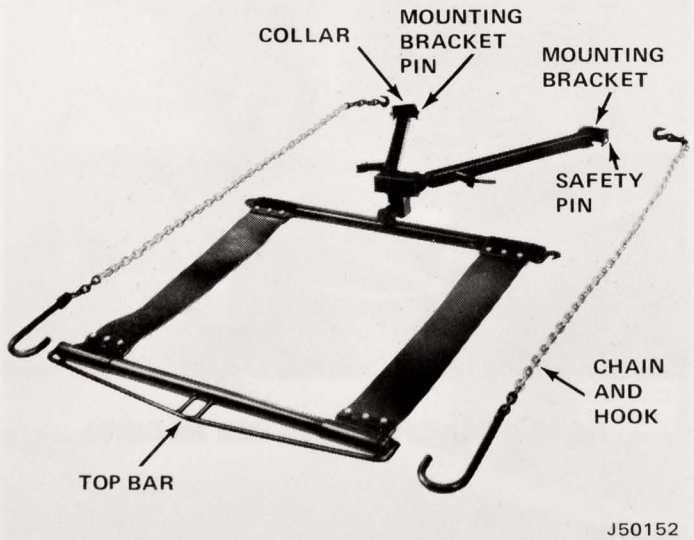


Fig. 10-9 Passenger Car Sling—Assembled View

(2) Position mounting brackets on rear of wrecker body.

(3) Use mounting brackets as template to locate mounting bolt holes.

(4) Drill four 1/2-inch diameter holes in rear of wrecker body.

(5) Remove safety pins securing mounting bracket pins and mounting brackets to collars (fig. 10-9). Remove pins and brackets.

(6) Position mounting brackets on wrecker body and secure with mounting bolts, lockwashers, and nuts. Tighten nuts to 39 foot-pounds torque.

(7) Position collars in mounting brackets and install mounting bracket pins. Secure bracket pins with safety pins.

(8) Install chain and hook assemblies (fig. 10-10).

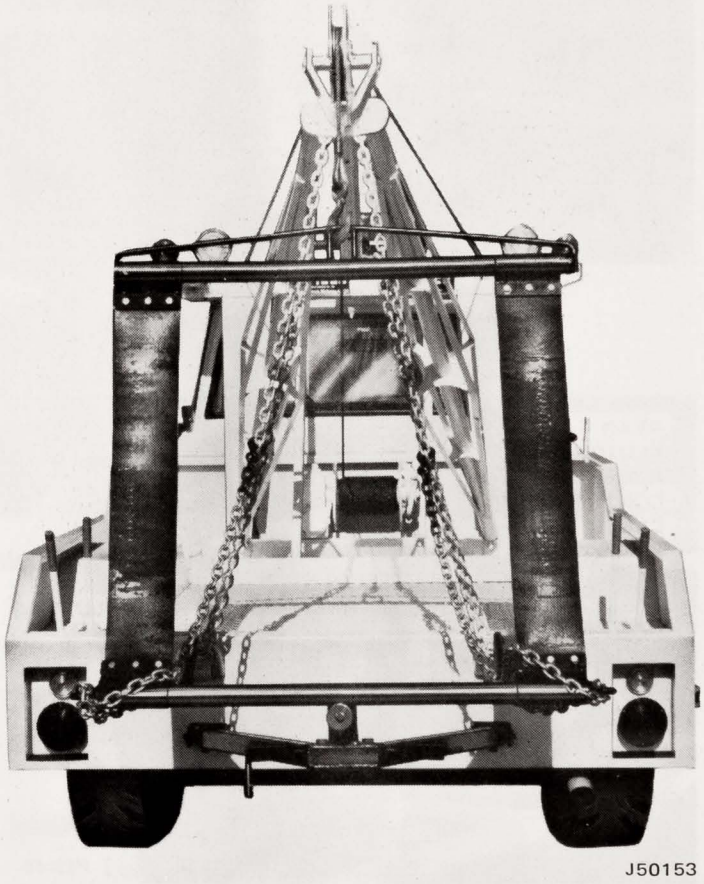


Fig. 10-10 Passenger Car Sling—Installed View

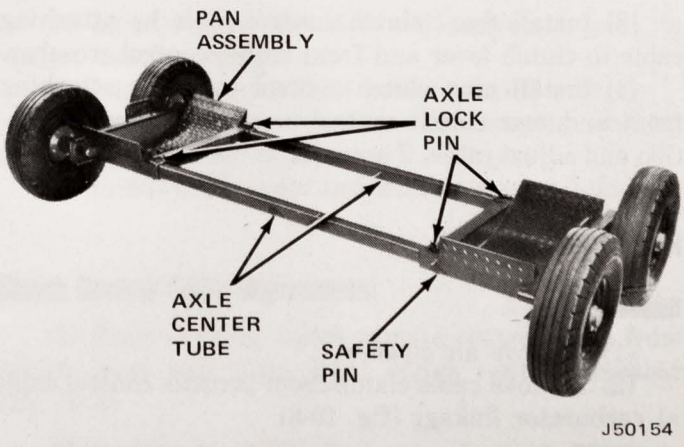


Fig. 10-11 Passenger Car Dolly—Assembled View

Passenger Car Dolly

Installation/Assembly

(1) Place pan assemblies on ground and position both axle center tubes in pan assemblies (fig. 10-11).

(2) Align holes in pan assemblies with holes in axle center tubes and install axle lockpins.

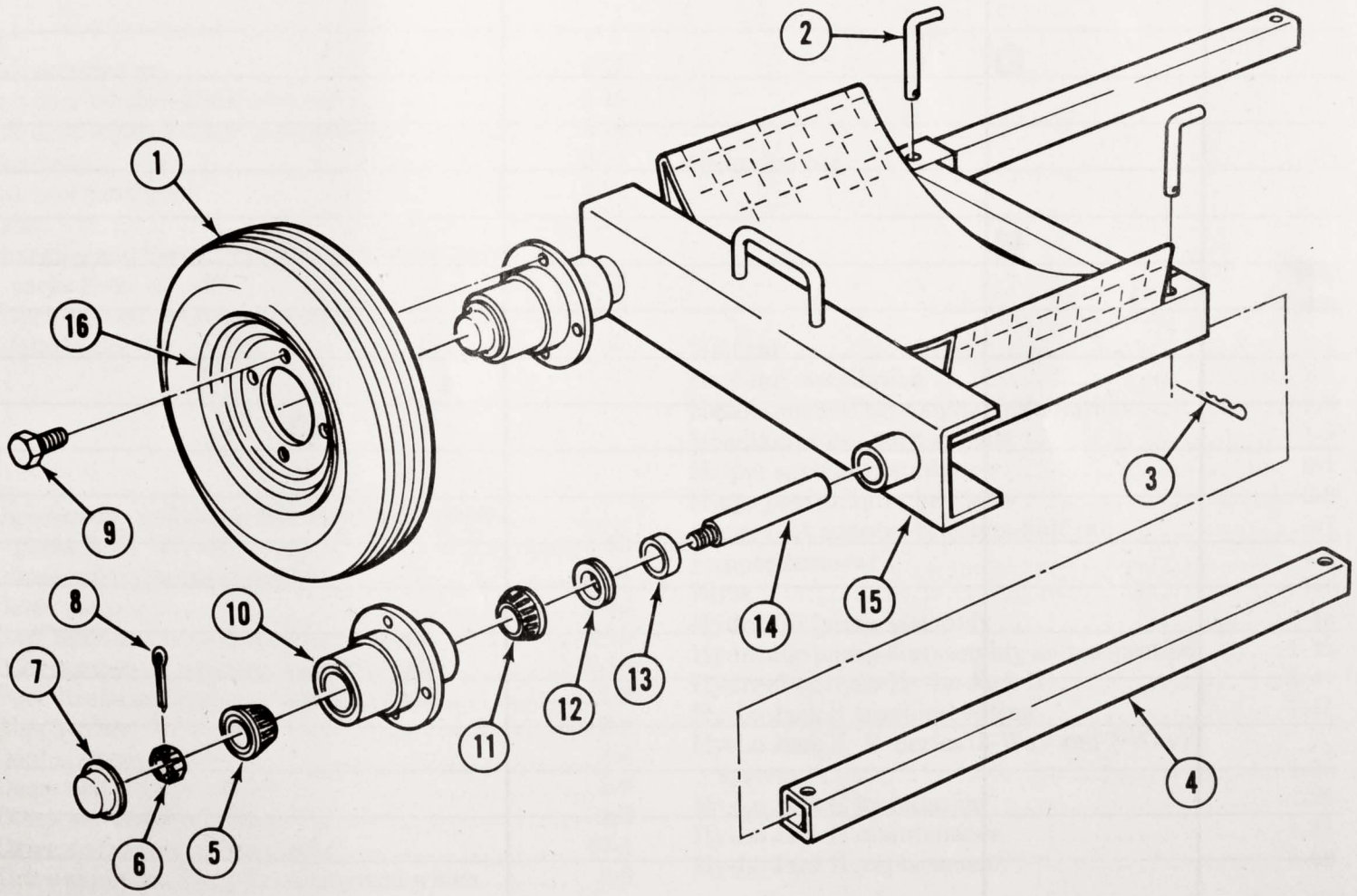
Repair/Replacement of Wheel Bearings

The wheel bearing assembly consists of the inside and outside tapered roller bearings, bearing cups, and grease seals (fig. 10-12). The bearings should be pressure lubricated with a smooth-textured, extreme-pressure grease with medium to short fiber length, composed of lithium soap and oils.

When repacking the wheel bearings, clean all parts in a suitable solvent. Inspect bearings and cups for excessive wear. Replace defective or worn parts. Always use a new seal upon assembly. Pack the bearings with a generous amount of high quality, lithium base, extreme pressure wheel bearing grease. Extra lubricant should be placed in the hub cavity between the bearings. When inspecting, replacing, or repacking bearings, be sure that the inner cones of the bearings are free to "creep" on the axle shaft. The bearings are designed to creep to permit a constantly changing load contact between the cones and the rollers. The axle shaft should be polished and lubricated to permit this creeping movement and prevent rust from forming.

Tire Repair

To repair a tire puncture, remove the tire from the rim and apply a combination vulcanized plug and patch from the inside. Externally applied plugs, blowout patches, and aerosol-type sealants should be considered only as emergency repairs.



1. TIRE
2. AXLE LOCK PIN
3. SAFETY PIN
4. AXLE CENTER TUBE
5. OUTSIDE WHEEL BEARING
6. WHEEL NUT
7. HUB CAP
8. COTTER PIN
9. LUG BOLT
10. WHEEL HUB
11. INSIDE WHEEL BEARING
12. GREASE SEAL
13. AXLE SPACER
14. AXLE SHAFT
15. PAN ASSEMBLY
16. WHEEL

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Fig. 10-12 Passenger Car Dolly—Exploded View

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